Memoria de Actividades 2019-2020

Instituto de Física Teórica UAM-CSIC
Institute for Theoretical Physics UAM-CSIC

http://www.ift.uam-csic

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Bienvenida
Welcome

Estas páginas contienen la Memoria Científica correspondiente a los años 2019-2020 del Instituto de Física Teórica (IFT) en Madrid. La segunda de estas anualidades se vió duramente afectada por la pandemia del COVID, por lo cual decidimos reunir las memorias de ambos años en un solo volumen.

Empecemos recordando, para un lector casual, lo que es el IFT y cuales son sus objetivos.

El IFT es el único centro español de investigación dedicado exclusivamente a la investigación en Física Teórica, enfocada en la exploración de frontera de las leyes fundamentales de la Naturaleza. Investigamos en las areas de Física de Partículas, Cosmología, Gravitación, Física de Astropartículas y Computación Cuántica, entre otras areas.

Nuestros investigadores lideran proyectos nacionales e internacionales, incluyendo varios proyectos en los programas ERC y MSCA en el marco del EU Horizon 2020. Los miembros del IFT desempeñan también un papel importante en el programa de posgrado en Física Teórica de la Universidad Autónoma de Madrid, tanto en docencia como en la supervisión de tésis de Master y Doctorado. Ademas de nuestra labor investigadora y docente, llevamos a cabo una muy importante labor en divulgación, dirigida tanto al público en general como a estudiantes y profesores de Enseñanza Secundaria.

Nuestro centro fue uno de los primeros en obtener la prestigiosa acreditación de Centro de Excelencia Severo Ochoa en 2012, que ha sido renovada hasta 2021. El IFT es un centro de investigación reconocido internacionalmente, con altos niveles de calidad, indicados por ejemplo por un valor excepcional en 2019 y 2020 del "Nature Excellence Index" que, como en años anteriores, coloca al IFT como centro de investigación lider en España y entre los mejores a nivel mundial en el area de las Ciencias Físicas.

A pesar de la pandemia del COVID, durante estos dos años la actividad del IFT ha aumentado tanto en calidad como en amplitud. Esto se ha debido al esfuerzo continuado de los miembros del IFT pero también debido a la incorporación de un número importante de nuevos investigadores a nuestro personal.

Empecemos con la lista de puestos permanentes cubiertos durante estos dos años. En 2020 David Cerdeño se incorporó al IFT desde la Universidad de Durham a traves

These pages contain the report of activities of the Institute of Theoretical Physics (IFT) in Madrid during the years 2019 and 2020. The second of these years was strongly affected by the COVID pandemia, which is why we decided to put together both reports into a single volume.

Let me first remind, for the benefit of a casual reader, what the IFT is and what its objectives are.
The IFT is the only Spanish research center dedicated exclusively to the research on Theoretical Physics and it focuses on the frontier exploration of the fundamental laws of nature. We carry out research on Particle Physics, Cosmology, Gravitation, Astroparticle Physics and Quantum Computation, among other areas.

Our researchers lead many national and international projects, including ERC and MSCA programs in the EU Horizon 2020 framework. In addition, the IFT members play an important role in the training of early stage researchers, by participating in the Theoretical Physics postgraduate program of the Universidad Autónoma de Madrid, both through teaching and supervising master and PhD thesis. In addition to our research and academic activities, we carry out a very strong outreach program, targeted both to the general public and High School teachers and students.

Our center was one of the first in obtaining the prestigious accreditation as Severo Ochoa Center of Excellence by the Spanish Ministry in 2012 which was again renewed until 2021. The IFT is an internationally recognized research center whose high standards are reflected e.g. by an outstanding value of the Nature Excellence Index obtained in 2019 and 2020, which like in previous years, ranks the IFT as the leading research center in Spain and among the best world-wide in the area of Physical Sciences.

In spite of the COVID pandemic, during these two years the activity at IFT has grown both in quality and scope. This has been the consequence of the continuing effort of the IFT members as well as the important number of new incorporations to the research staff.

Let me first list all the senior permanent positions filled during these two years. In 2020 David Cerdeño joined the IFT coming from the University of Durham through a prestigious

de un prestigioso puesto de profesor "Beatriz Galindo" en la UAM. Esto es una gran noticia para el refuerzo de nuestras actividades en el area de Materia Oscura. En 2019 el miembro del IFT y bien conocido experto en Teoría de Campos en el retículo, Gregorio Herdoiza, fue confirmado com profesor permanente en la UAM.

Si bien ambos puestos tienen su origen en la UAM, tres nuevos permanentes se han materializado en el IFT a finales de 2020 via CSIC. Estos puestos corresponden a Juan Antonio Aguilar Saavedra, reconocido experto en física de colisionadores y miembro de la colaboración ATLAS en el LHC (CERN), que viene de la Universidad de Granada trayendonos su experto conocimiento de la física de colisionadores. El miembro del IFT Savas Nesseris, cosmólogo y experto en aplicaciones de la Inteligencia Artificial a esta disciplina, obtuvo un puesto de Científico Titular. Finalmente, nos es muy grato dar la bienvenida a Alejandro Bermudez, proveniente de la Universidad Complutense de Madrid,un reconocido experto en Información Cuántica. Traerá nuevas fuerzas al Grupo de Información Cuántica del IFT.

A estos puestos permanentes hay que añadir la incorporación, como contratados Ramón y Cajal, de Pilar Coloma (física de neutrinos) y Jose Miguel No (fenomenología), así como cuatro contratos senior del programa Atracción de Talento de la Comunidad Autónoma de Madrid: Ernesto Arganda (física de colisionadores), Paolo Benincasa (amplitudes de dispersión/teoría de cuerdas), Matteo Fasiello (cosmología) y Sachiko Kuroyanagui (ondas gravitacionales). Todos estos investigadores de talento, junto con los nuevos puestos permanentes arriba mencionados significan en conjunto un auténtico salto cualitativo del IFT en términos de conocimiento experto así como de calidad en la investigación junto con la apertura de nuevas lineas de investigación.

Dos de nuestros miembros senior, Alfredo Poves y Enrique Alvarez, que fueron los primeros directores del IFT durante 1994-2002, llegaron a su fecha de retiro en 2019-2020. El IFT debe mucho a estos queridos colegas que sin embargo seguirán con nosotros como eméritos, contribuyendo al IFT con su investigación y experiencia.

Finalmente tenemos que lamentar la muerte del Dr. Mathieu Boudaud, que se incorporó como postdoc al grupo de Astropartículas en Octubre de 2019, y tristemente falleció en enero de 2020 en Barcelona. Era un científico de talento, muy querido por su familia y amigos. Renovamos aquí nuestro pésame a su familia y amigos.

Durante 2019 y 2020 el IFT mantuvo sus actividades en los mas altos niveles. Cuando el primer golpe mas duro de la pandemia llegó a comienzos de marzo de 2020, intentamos y conseguimos convertir las actividades a versión online. Varias workshops, programas y escuelas fueron cancelados

Beatriz Galindo Senior Staff position at UAM. This is great news for the reinforcement of our activities in the area of Dark Matter. In 2019 the IFT member and well known expert in Lattice Field Theory Gregorio Herdoiza got tenure.

While these two positions came through the UAM, three new permanent positions have materialized by the end of 2020 via CSIC. These correspond to Juan Antonio Aguilar, well known expert in collider physics and member of the ATLAS collaboration at LHC (CERN), coming from Granada University and bringing new expertise in collider physics. The IFT member Savas Nesseris, cosmologist and expert on the applications of artificial intelligence to this discipline, got tenure. Finally, we are very happy to welcome Alejandro Bermudez, coming from the Universidad Complutense of Madrid , a recognized expert in Quantum Information. He will bring new forces to our Quantum Information Group at IFT.

To all those permanent appointments we have to add the incorporation of two Ramon y Cajal Fellows, Pilar Coloma (Neutrino Physics) and Jose Miguel No (Phenomenology) as well as four Junior Staff from the Atracción de Talento program of the Madrid local government: Ernesto Arganda (Collider Physics), Paolo Benincasa (Scattering Amplitudes/String Theory), Matteo Fasiello (Cosmology) and Sachiko Kuroyanagui (Gravitational Waves). All these talented young physicists, together with the permanent appointments above signify altogether a real qualitative jump of the IFT in terms of expertise and reserach quality along with the opening of new research lines.

Two of our senior members, Alfredo Poves and Enrique Alvarez, who were the first directors of the IFT during 1994-2002, got their retirement age in 2019-2020. The IFT owes much to these dear colleagues that, nevertheless, will remain with us as emeriti contributing to IFT through their research and experience.

Finally we have to mourn the death of Dr. Mathieu Boudaud, who joined IFT as a postdoc in the Astroparticle group in October 2019, and sadly died in January 2020 in Barcelona. He was a talented scientist, beloved by his family, friends and colleagues. We renew here our condollences to family and friends.

During 2019 and 2020 the IFT maintained its activities at the highest standards. When the highest shock of the pandemic arrived at the beginning of March 2020, we tried and succedded to bring the activities online. A number of workshops, programs and schools were cancelled whereas others were given an online format. The journal

mientras a otros se les dió formato online. Los 'journal-clubs' y seminarios continuaron de forma regular a traves de Zoom. Esta transformación se llevó a cabo en un mes, de mediados de marzo a mediados de abril, de tal forma que, desde el punto de vista científico, el impacto de la pandemia se minimizase. Esto se puede percibir por el número de publicaciones y actividades. Durante 2019 el IFT publicó 255 artículos y 278 en 2020, hubo 56 seminarios en 2019 y 72 en 2020 (en su mayoria online). Lo mismo se puede decir de las actividades de formación: 16 tésis de master en 2019 y 17 en 2020. En conjunto se leyeron 25 tésis de doctorado en 2019-2020.

Desde el punto de vista de la organización en el IFT, en 2019 se creó un comité de Igualdad, Diversidad e Inclusión (IDI) con el objetivo de asesorar a la Dirección y a la Junta de Instituto en estos importantes temas asi como para elaborar un Plan de Acción para el IFT, que está ya confeccionado y será aprobado en 2021. Agradecemos a todos los miembros del comité por su esfuerzo y dedicación.

En octubre de 2019 recibimos la visita de nuestro Comité Científico Asesor (CCA) que se entrevistó con los organos directores del IFT asi como con miembros senior, postdocs, predocs, miembros del IT y de la administración del instituto. Elaboraron un informe mostrando su impresión muy positiva del IFT, dando una serie de recomendaciones para la mejora de diferentes aspectos de organización dentro del IFT. Agradecemos al CCA por su trabajo y sus muy útiles sugerencias que trataremos de implementar en el instituto.

En 2020 el CSIC promovió la elaboración de un 'Libro Blanco' delineando las prioridades científicas y tecnológicas en todas las areas cubiertas por el CSIC. El IFT, a traves de sus representantes Tomás Ortín, Alberto Casas, Sven Heinemeyer, Fernando Marchesano y Germán Sierra, realizó una importante labor en la preparación del Volumen 9, dedicado a la "Comprensión de los componentes básicos del universo, su estructura y evolución" y el Volumen 10, dedicado a la "Información Compleja y Digital".

Entre muchas participaciones de miembros del IFT en comités científicos internacionales durante estos años hay que destacar la participación de Belen Gavela en el 'Preparatory Physics Group' para la elaboración del ''2020 Update of European Strategy for Particle Physics" que presentó su informe final en 2020.

Finalmente, nuestras unidades de divulgación y comunicación han consolidado al IFT como un importante actor en los medios científicos de YouTube. Nuestro canal de YouTube ha superado los 500.000 suscriptores y nuestros videos han obtenido mas de 30,000,000 visionados en estos años. Estas cifras son competitivas a nivel global en el area de educación científica en Física en esta plataforma.

clubs and the seminars went on regularly via Zoom. This transformation took place within a month, from mid-March until mid-April, in such a way that, from the scientific point of view, the impact of the pandemic was minimized. This may be judged from the number of publications and activities. During 2019 the IFT published 255 papers and 278 in 2020, there were 56 seminars in 2019 and 72 in 2020 (mostly online). The same can be said of the training activities: 16 master thesis in 2019 and 17 in 2020. Altogether 25 thesis were defended in 2019-2020.

From the point of view of the IFT organization, an Equity, Diversity and Inclusion (EDI) committee was created in 2019 with the mandate to advise the Directors and the Institute Board on these important issues as well as to elaborate an Action Plan for the IFT, which is by now finished and will be approved in 2021. We very much thank al the members of the committee for their effort and commitment.

In October 2019 we received the visit of our Scientific Advisory Board who had a series of meetings with the governing bodies of the IFT as well as with senior staff, postdocs, predocs, IT members and administration of the institute. They produced a report in which they showed a very positive impression about IFT while giving a number of recommendations for improvements in different aspects of IFT organization. We thank our SAB for their work and their very useful suggestions which we will try to implement in the institute.

In 2020 CSIC promoted the elaboration of a 'White Book' delineating the scientific and technological priorities in all areas covered by CSIC. The IFT, through their representatives Tomás Ortin, Alberto Casas, Sven Heinemeyer, Fernando Marchesano and Germán Sierra, played an important role in Volume 9, dedicated to the 'Understanding the basic components of the universe, its structure and evolution', and Volume 10, about "Complex and Digital Information".

Among many participations of IFT members in relevant international scientific committees during these years we have to highlight the participation of Belen Gavela in the 'Preparatory Physics Group' for the elaboration of the '2020 Update of European Strategy for Particle Physics' which delivered their final report in 2020.

Finally, our outreach and communication units have consolidated the IFT as an important actor in the YouTube scientific media. Our YouTube channel has reached over 500.000 subscribers and our videos have obtained more than 30,000,000 views so far. These figures are competitive at the global level in the area of the scientific education in Physics in this platform. In addition we have continued with

Asi mismo hemos continuado con nuestro gran esfuerzo en el sector de la Enseñanza Secundaria, dando alrededor de 100 charlas a estudiantes y cursos a profesores del area de Madrid, aunque esta última actividad ha bajado en cierta medida en 2020 debido a las restricciones COVID.

Finalizamos estas lineas agradeciendo a todo el personal del IFT, estudiantes, postdocs, investigadores senior asi como a nuestro siempre competente personal de administración, comunicación e IT por su duro trabajo y dedicación. Ellos han mantenido al mas alto nivel las actividades del centro en un entorno hostil. También agradecemos a todo el personal por el cumplimiento de las instrucciones de seguridad dadas por nuestras instituciones, CSIC y UAM. Afortunadamente, aunque algunos miembros del IFT contrajeron el COVID, la mayoria de los casos fueron leves, esencialmente sin consecuencias a largo plazo.

En cualquier caso, no ha sido facil, y es triste ver a nuestro hermoso edificio del IFT prácticamente desierto, sin seminarios presenciales, journal clubs, discusiones por los pasillos y la Sala Comun.

¡Todos esperamos y confiamos que 2021 nos va a traer el final de la pandemia y la recuperación de la vida normal en el IFT!

our strong effort in the High School sector, giving around 100 talks to students and courses to teachers in the Madrid area, although this latter activity has declined somewhat in 2020 due to the Covid restrictions.

Let us end these lines by thanking all the IFT personnel, students, postdocs, senior researchers as well as our always competent administration, communication and IT personnel for their hard work and dedication. They have maintained at the highest level the activities of the center in a hostile environment. We also have to thank all the personnel for following the safety indications given to us by our parent institutions, CSIC and UAM. Fortunately, although some members of IFT have contracted COVID, most of the cases were mild, with essentially no long-term consequences.

It has not been easy though, and it is sad to see our IFT beautiful building almost deserted, no presential seminars, journal clubs, discussions in the corridors and in the common room.

We all hope and expect that 2021 will bring the end of the pandemic and the recovery of normal life at IFT !

Luis Ibáñez
Director / Director

Cantoblanco, Enero 2021 //
Cantoblanco, January 2021

Parte I

Part I

Presentación

Presentation

1

Objetivos
Mission Statement

Objetivos

El Instituto de Física Teórica (IFT/UAM-CSIC) es un centro mixto perteneciente al Consejo Superior de Investigaciones Científicas (CSIC) y a la Universidad Autónoma de Madrid (UAM).

La misión del IFT es crear las condiciones y sinergias necesarias para el desarrollo de la investigación de excelencia en la frontera de la física teórica, incluyendo la física de partículas elementales, la física de astropartículas, la cosmología, la gravitación cuántica, la teoría de cuerdas y la teoría cuántica de campos. El objetivo último del IFT es contribuir a la comprensión de las leyes fundamentales de la naturaleza en el micro- y el macrocosmos. Además de la actividad puramente investigadora, en el IFT se realiza una intensa tarea de formación de jóvenes investigadores y profesionales a través de programas de postgrado, así como una labor de transferencia de conocimiento a la sociedad a través de programas de divulgación.

Mission Statement

The Institute of Theoretical Physcs (IFT/UAM-CSIC) is a Joint centre between the Spanish Research Council (Consejo Superior de Investigaciones Científicas, CSIC) and the Autonomous University of Madrid (Universidad Autónoma de Madrid, UAM).

The mission of the IFT is to create the conditions and synergies necessary for the development of research of excellence in the frontiers of theoretical physics in the areas of elementary particle physics, astroparticle physics, cosmology, quantum gravity, string theory and quantum field theory with the aim to understand the fundamental laws of nature in the micro- and the macrocosmos. Besides purely research activity, the IFT conducts also high-quality training of early stage researchers and professionals through posgraduate programs with UAM, as well as knowledge transfer to the society through outreach activities

2 Historia
History

Direcciones / Directorates		
Nombres / Names	Función / Function	Período / Period
Alfredo Poves	Director / Director	1994 - 1997
Enrique Álvarez	Vicedirector / Deputy director	
Enrique Álvarez	Director / Director	01/1998 - 02/2002
César Gómez	Vicedirector / Deputy director	
César Gómez	Director / Director	03/2002 - 05/2006
Antonio González-Arroyo	Vicedirector / Deputy director	
Antonio González-Arroyo	Director / Director	05/2006 - 04/2009
Germán Sierra	Vicedirector / Deputy director	
Alberto Casas	Director / Director	05/2009 - 08/2012
Carlos Muñoz	Vicedirector / Deputy director	
Carlos Muñoz	Director / Director	09/2012 - 09/2015
Margarita García Pérez	Vicedirector / Deputy director	
Angel M. Uranga	Director / Director	09/2015 - 10/2018
Luis E. Ibáñez	Vicedirector / Deputy director	
Luis E. Ibáñez	Director / Director	10/2018 - present
José L. Fernández Barbón	Vicedirector / Deputy director	

El Instituto de Física Teórica (IFT UAM-CSIC) se gestó en el año 1994 cuando equipos de investigación consolidados pertenecientes a las dos instituciones madre, Consejo Superior de Investigaciones Científicas (CSIC) y Universidad Autónoma de Madrid (UAM), decidieron sumar esfuerzos con objeto de generar sinergias y adquirir la masa crítica necesaria para desempeñar un papel relevante en el escenario internacional de la investigación en el área. El proceso de creación del instituto pasó por varias fases: Primero se creó un instituto universitario de la UAM del mismo nombre (Abril 1996), que posteriormente se adscribió al CSIC como unidad asociada (23 de Abril de 1998). El 31 de Octubre de 2001 la Junta de gobierno del CSIC aprobó su constitución como Instituto mixto. El convenio de colaboración para la creación del instituto fue firmado por ambas instituciones el 13 de Junio 2002. El 10 de Octubre de 2003 el instituto recibió la notificación de puesta en marcha efectiva.

En cuanto a su ubicación, en los primeros años el IFT ocupó varias dependencias dentro de las instalaciones de la Facultad de Ciencias de la UAM distribuidas en los módulos 8 y 15 (antiguos C-XI y C-XVI). Desde enero de 2011 ocupa una de las alas del edificio del Centro de Física Teórica y Matemáticas (CFTMAT) en el campus de la UAM.

Hoy en día, el IFT es un centro de referencia nacional e internacional en Física Teórica. Desde 2009 forma parte de la línea estratégica 'Física Teórica y Matemáticas' del Campus de Excelencia Internacional (CEI) UAM + CSIC y desde 2012 está reconocido como Centro de Excelencia Severo Ochoa, acreditación que ha renovado con éxito en 2017. Todos estos logros del IFT no hubieran sido posibles sin el esfuerzo decidido de sus investigadores así como de los equipos de gobierno que en distintas etapas han dirigido su funcionamiento. En la tabla adjunta se recogen, en su representación, las direcciones de los mismos así como los períodos correspondientes.

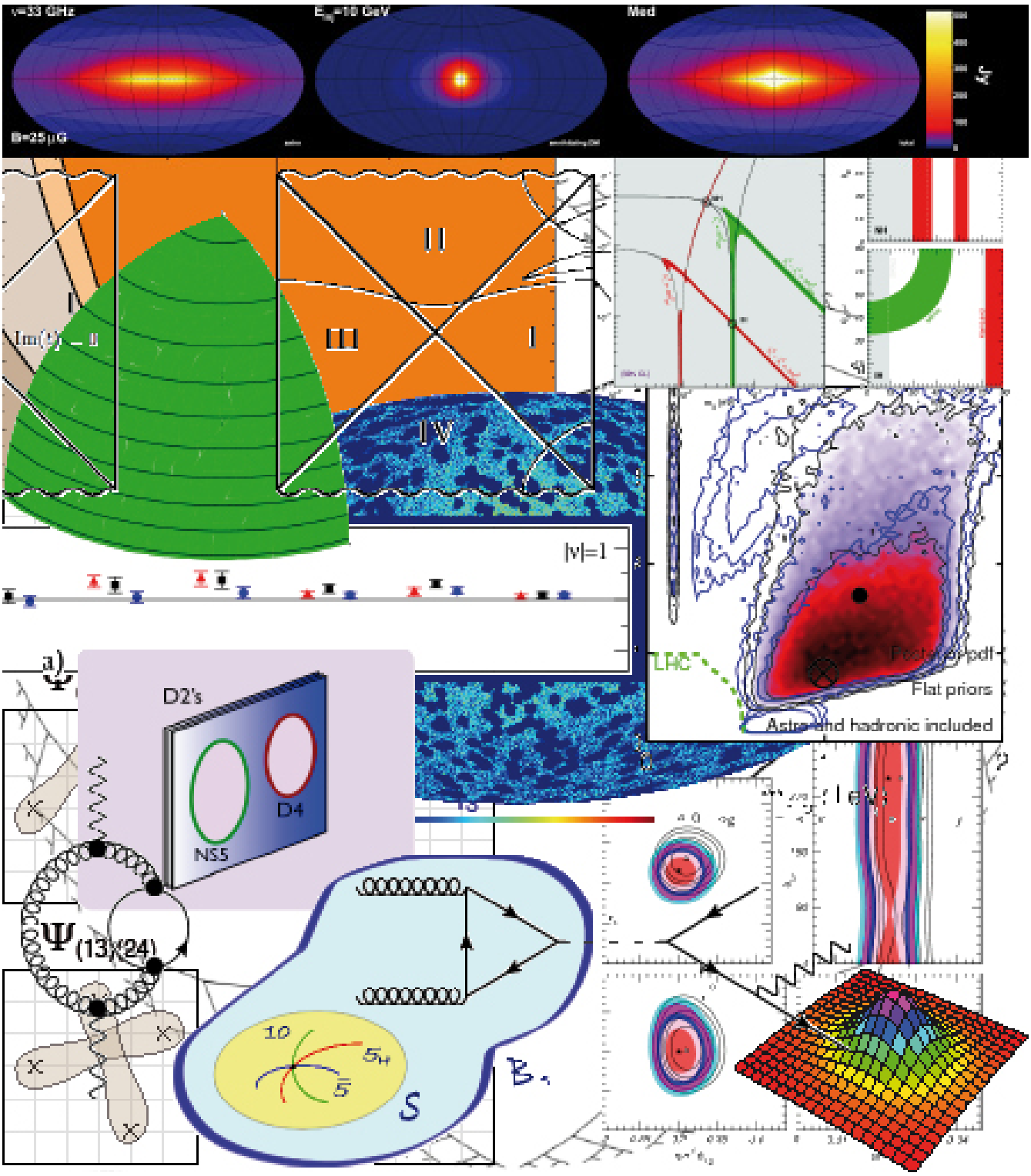
The Institute for Theoretical Physics (IFT UAM-CSIC) was conceived in 1994 when established research teams belonging to both mother institutions, the Spanish Research Council (CSIC) and the Autonomous University of Madrid (UAM), decided to join efforts to generate synergies and acquire the critical mass to play a role in the international area of research in the field. The administrative creation process went through several phases: first as a university institute (April 1996), subsequently attached to the CSIC as an associate unit (23 April 1998). On 31 October 2001 the Governing Board of the CSIC adopted its constitution as a mixed Institute. The collaboration agreement for the establishment of the institute was signed by the two mother institutions on 13 June 2002. On 10 October 2003 the institute received notification of effective implementation.

Concerning its location, in the early years the IFT premises were located in the Faculty of Sciences of the UAM Modules 8 and 15 (former C-XI and C-XVI). Since January 2011 it occupies one wing of the building of the Centre for Theoretical Physics and Mathematics (CFTMAT) on the campus of the UAM.

Today, the IFT is a centre of national and international reference in Theoretical Physics. Since 2009 it is part of the strategic line 'Theoretical Physics and Mathematics' Campus of International Excellence (CEI) UAM + CSIC and since 2012 it is recognized as a Severo Ochoa Centre of Excellence, a recognition which was renewed in 2017. All these achievements would not have been possible without the determined effort of its researchers and governing teams which have led the operation of IFT at its different stages. On their behalf, we collect the directorates of the corresponding periods in the table.

3

Investigación
Research



El IFT es un centro de investigación básica enfocado a explorar las fronteras de nuestro conocimiento fundamental de la naturaleza. Su organización está adaptada al carácter único de esta investigación. En el umbral del siglo XXI, podemos identificar en términos generales tres fronteras que limitan nuestro conocimiento de las leyes fundamentales de la Naturaleza: lo infinitamente pequeño, lo infinitamente grande, y la frontera de la complejidad.

- La frontera de lo infinitamente pequeño es el régimen de la Física de Partículas de altas energías, que se centra en el comportamiento de los constituyentes más pequeños de la materia, y las interacciones fundamentales entre ellas.

- La frontera de lo infinitamente grande corresponde a la Cosmología, que explora las propiedades del Universo considerado como un todo, abarcando desde su origen primordial, su evolución en el tiempo y su composición actual, hasta su destino último.

- La frontera de la complejidad se refiere a los fenómenos emergentes. Este campo abarca de forma transversal múltiples áreas del conocimiento humano, como la biología o las ciencias sociales, pero tiene manifestaciones específicas en la Física Fundamental. Éstas surgen en el comportamiento de partículas y fuerzas en condiciones extremas, en las que las correlaciones cuánticas colectivas generan nuevos fenómenos dinámicos, que posiblemente podrían proporcionar nuevas claves sobre la naturaleza fundamental del espacio y el tiempo.

A pesar de la aparente disparidad, estas tres fronteras del conocimiento se funden en el comienzo del Universo, remitiéndonos continuamente al origen del Cosmos y sus leyes. La Historia de la Física nos enseña que las respuestas a las preguntas de una línea de investigación muchas veces iluminan profundos enigmas de otras áreas. La interrelación entre estos campos de investigación convierte al IFT en un crisol de conocimiento compartido de diversas áreas en continua interacción.

El IFT se organiza en cuatro líneas de investigación que encajan con una o varias de estas fronteras, y que se focalizan en retos concretos del actual momento histórico en el campo de la Física Fundamental: (i) el origen de la masa, (ii) el origen y composición del universo, (iii) teoría de cuerdas y gravedad cuántica, (iv) sistemas fuertemente cuánticos.

The IFT is a center of basic research focused on pushing the boundaries of our fundamental understanding of nature. Its organisation is tuned to the unique character of this scientific endeavour. As we stand on the threshold of the XXI century, there are three main boundaries limiting our understanding of the fundamental laws of nature: the short distance frontier, the long distance frontier and the complexity frontier.

- The short-distance frontier is the traditional realm of high-energy particle physics, focused on the behaviour of the most elementary constituents of matter and the most fundamental forces of nature at the smallest distance scales.

- The long-distance frontier is the traditional realm of cosmology, the focus being on properties of the universe as a whole, from its primordial origin and its evolution in time until present day, to its composition and eventual fate.

- The complexity frontier is the realm of emergent phenomena. While this frontier cuts through the whole body of human scientific knowledge, such as biology or social sciences, it has specific manifestations in fundamental physics, having to do with the behaviour of elementary particles and forces in extreme conditions, in situations where collective quantum correlations are dominant and generate new dynamical phenomena, which could perhaps even encode keys to the fundamental nature of space and time.

Despite their apparent disparity, these three boundaries of knowledge meet and confound themselves at the singular beginning of the universe, moving us towards a continuous quest about Cosmos and its fundamental laws. Physicists have learned in the last century that the key to progress in one of these realms is often to be found in another one. The interplay among these fields turn the IFT into a melting pot of shared expertises in continuously interacting research areas.

The IFT is organized along four main lines of research which, while fitting in the general 3-component boundary explained above, resonate to concrete challenges within the current historic state of fundamental physics: (i) the origin of mass; (ii) the origin and composition of the Universe; (iii) string theory and quantum gravity; (iv) strongly quantum systems.

El origen de la masa: El Modelo Estándar de partículas elementales y más allá

La pregunta fundamental en este área de investigación es la explicación teórica de las masas de las partículas elementales. La cuestión del origen de la masa es claramente fundamental y clave en nuestra comprensión de la Física de Partículas, que gira alrededor de los conceptos de la ruptura espontánea de la simetría electrodébil mediante el campo de Higgs. Las investigaciones del IFT se centran en el estudio de las propiedades del bosón de Higgs, descubierto en el laboratorio CERN en Ginebra (Suiza) en 2012, en el Modelo Estándar de partículas elementales, y en extensiones del mismo, basadas en las ideas de supersimetría o de modelos compuestos en acoplamiento fuerte. Asimismo, el papel que juegan los neutrinos en este esquema es otro de los clásicos problemas teóricos de la física de partículas, cuyas implicaciones podrían incluso explicar el misterio de la asimetría entre materia y antimateria en el Universo.

En los próximos años, los desarrollos más activos del campo estarán dominados por el estudio del bosón de Higgs y sus interacciones, y por la determinación de los parámetros del sector de los neutrinos. Una fracción importante del trabajo teórico en este área está por tanto directamente relacionado con los resultados de la segunda fase del LHC en el CERN, y con futuros experimentos de neutrinos. El IFT mantiene contacto directo con estas instalaciones, especialmente a través de colaboraciones con el grupo de Teoría del CERN, de la coordinación de la redes europeas RISE Invisibles Plus y ITN Elusives en el campo de la Física de neutrinos, y de la participación en los grupos teóricos de experimentos de neutrinos como HyperKamiokande y DUNE.

El origen y la composición del Universo: Física de Astropartículas y Cosmología

Este área de investigación gira alrededor del tremendo desarrollo de las técnicas de observación del Universo en las últimas décadas, con un enorme caudal de datos experimentales de precisión sobre su naturaleza y propiedades, desde la Astrofísica hasta las más profundas cuestiones sobre la naturaleza del espacio y el tiempo. Este campo está directamente vinculado al desarrollo de nuevas ventanas al Universo, como por ejemplo la espectacular detección de ondas gravitacionales producidas por colisión de agujeros negros binarios.

La investigación del IFT se centra en el estudio de la época primigenia, cercana al origen del Universo, y en el estudio teórico de su evolución y su composición

Origin of mass: Standard Model of Particle Physics and Beyond (BSM).

This research area focuses on the theoretical explanation of the masses for elementary particles. The origin of mass is an obviously fundamental question and central to our understanding of particle physics, revolving aroudn the concept of spontaneous electroweak symmetry breaking by the Higgs field. Research at the IFT has a strong focus on the study of the Higgs boson discovered at CERN, Geneva (Switzerland) in 2012. This exploration is carried out both in the framework of the Standard Model of particle physics and also in extensions thereof (mainly based on the idea of supersymmetry, or in strongly coupled composite models). It also includes the study of neutrino masses and mixing, a classic area of research since the manifestation of neutrino mass matrices in neutrino oscillation experiments; the implications in this area may even shed light on the problem of the matter-antimatter asymmetry in the Universe.

In the following decades this field is likely to be dominated by the study of the Higgs boson and its interactions, as well as the determination of neutrino sector parameters. A significant fraction of the theoretical work in this area is conditioned by the current running of the Large Hadron Collider at CERN, well into its second phase, as well as forthcoming neutrino oscillation experiments. The IFT is in an optimal position, with direct contact with the main international collaborations, specially with the CERN Theory Group, with the coordination of the EU RISE Invisible Plus and ITN Elusives in the field of neutrino physics, and via the participation of IFT members in theory groups in experimental collaborations like HyperKamiokande and DUNE.

Origin and composition of the universe: Astroparticles and Cosmology

This is a young science, which has been bolstered in the last two decades by a wealth of precision data from observatories on the planet and on space. It merges with astrophysics at one end and with the deepest questions about the nature of space and time at the other end. Mid to long-term strategy is dominated by the opening of new windows into the structure of the universe. A perfect example of this phenomenon is the recent spectacular discovery of gravitational waves produced by merging black holes.

The main questions on which the IFT group focuses on the sutdy of the primitive Universe, and the theoretical analysis of its evolution and present composition;

actual; especialmente en la naturaleza y propiedades de la materia oscura y la energía oscura, que conjuntamente forman el 95% de la densidad de energía del Universo. Todos estos estudios son sinérgicos con la investigación de Física de Partículas más allá del Modelo Estándar mencionada anteriormente.

El estudio de las condiciones reinantes en las épocas más remotas, cercanas al Big Bang, está dominado en las últimas décadas por la hipótesis de la inflación cósmica. El IFT se distingue por albergar grandes expertos en la construcción de modelos de inflación fundamentados en física microscópica de partículas elementales o teoría de cuerdas.

El problema de la elucidación de la materia oscura en el Universo es una de las prioridades del IFT, ya sea en la elaboración de modelos teóricos, como en la comparación con los resultados de búsquedas directas o indirectas, como por ejemplo excesos de emisiones de rayos gamma en el centro de la Vía Láctea o la distribución detallada de materia en halos galácticos.

En los próximos años, se espera un continuo flujo de datos observacionales en este campo, con una gran oportunidad asociada a las nuevas ventanas al Universo abiertas por la espectacular reciente detección de ondas gravitacionales emitidas por la colisión de agujeros negros. El IFT coordina la red MultiDark, la mayor red española (con participación internacional) de grupos de investigación en materia oscura. Además, varios miembros del IFT participan como teóricos en colaboraciones experimentales actuales y futuros. En concreto, en DES, Euclid, eBOSS, DESI, SKA, PAUS, LSST, LISA, Einstein Telescope, SuperCDMS, KAGRA, DECIGO, Parks PTA, Planck, Fermi, CTA.

Materia cuántica y campos cuánticos: Teorías en el retículo, información cuántica y materia condensada

La frontera de la complejidad se manifiesta en la Física Fundamental esencialmente en el estudio de sistemas cuya dinámica es radicalmente cuántica. Esto se produce bien porque la dinámica del vacío incluye interacciones intensas, como en la Cromodinámica Cuántica (QCD, por sus siglas en inglés) que describe las interacciones fuertes entre quarks y gluones, o bien por la existencia de correlaciones cuánticas de gran alcance incluso en sistemas con muchas partículas, como en determinados ámbitos en Física de la Materia Condensada. El denominador común es la exploración de la Teoría Cuántica de Campos en sus extremos, usando aproximaciones multidisciplinares de física estadística, materia condensada, redes ópticas, grupo de renormalización, simetría conforme, y más recientemente dualispecially the nature and properties of dark matter and dark energy, which jointly provide 95% of the energy budget in the Universe. These studies are sinergetic with research in Particle Physics beyond the Standard Model mentioned above.

The study of the conditions controlling the first instants of the Universe is dominated by the concept of cosmological inflation. The IFT researchers are world-class experts in the building of models for the inflationary epoch from fundamental Particle Physics and string theory models, and in comparison with observational data.

The problem of clarifying the nature and distribution of dark matter in the Universe is of highest priority at the IFT. There is vigorous research in building theoretical models both using BSM Particle Physics models, and other ideas; also in the comparison with observational results from direct and indirect searches, like emission excess of gamma rays from the center of the Milky Way, and the detailed study of matter in galactic halos.

In coming years, we expect an increased flux of observational data in the field, with an enormous opportunity from new windows to the Universe with the recent detection of gravitational waves from black hole mergers. The IFT is well positioned to be world-competitive, as it coordinates the MultiDark network, the largest network of Spanish research groups (with international participation as well) in the field of dark matter. Moreover, several IFT members participate as theorists in present and forthcoming experimental collaborations. Concretely in DES, Euclid, eBOSS, DESI, SKA, PAUS, LSST, LISA, Einstein Telescope, SuperCDMS, KAGRA, DECIGO, Parks PTA, Planck, Fermi, CTA.

Quantum matter and fields: Lattice Gauge Theories, Quantum Information and Condensed Matter

The complexity frontier touches on fundamental physics mostly through the study of systems whose behaviour is most radically quantum mechanical. This comes about either when the vacuum dynamics contains strong interactions, like in the theory of quarks and gluons in Quantum Chromodynamics, or in situations featuring distinctively quantum character despite having many degrees of freedom, a common occurrence in condensed matter physics. The main common denominator across this vast research area is Quantum Field Theory, essentially the basic framework of modern physics, using a multidisciplinar approach with techniques from Statistical Physics, Condensed Matter, optical lattices, renormalization group, conformal symmetry, and most recently holographic

dades holográficas con sistemas gravitacionales.

El IFT siempre ha desarrollado una labor importante en el estudio de QCD, tanto a nivel matemático como en el desarrollo de códigos numéricos dedicados. Este trabajo es esencial en la comparación con resultados experimentales de física de quarks pesados, una de las posibles ventanas a nueva física más allá del modelo estándar.

En el campo de los fenómenos colectivos en materia condensada y computación cuántica, el IFT es competitivo a nivel internacional en el diseño teórico de simuladores cuánticos, conjuntos de átomos fríos en redes ópticas de láser que simulan la dinámica de sistemas de materia condensada, con posibles aplicaciones a información cuántica.

En sistemas en los que los métodos analíticos o la simulación numérica son poco eficientes, como en sistemas fuertemente acoplados y en evolución temporal, el IFT ha desarrollado una intensa actividad con grandes resultados utilizando las dualidades holográficas con sistemas gravitacionales. Existen líneas establecidas de trabajo que analizan la dinámica de la termalización en plasmas con interacciones fuertes, el cálculo de entrelazamiento cuántico y su interpretación geométrica, y los fenómenos de transporte en materiales exóticos como semimetales y aislantes topológicos.

La relación sinérgica entre el estudio de sistemas fuertemente cuánticos con otras líneas de investigación, especialmente los sistemas gravitacionales mediantes las dualidades holográficas, permiten visualizar nuevos niveles de comprensión de problemas como el confinamiento de los quarks, los superconductores de alta temperatura, y el desarrollo de ideas clave en Computación Cuántica.

Teoría de cuerdas y gravedad cuántica

Este área de investigación explora las leyes fundamentales en situaciones en las que la naturaleza cuántica de la gravedad es relevante. La unificación de la materia y el espacio-tiempo se ha convertido en una posibilidad al alcance de la Física del siglo XXI, de la mano del desarrollo de la teoría de cuerdas en las últimas décadas, que ha cristalizado en la propuesta de dualidades holográficas entre sistemas que relacionan soluciones gravitacionales de tipo agujero negro con sistemas de muchas partículas en acoplamiento fuerte. Se trata de una exploración especulativa y abierta, pero directamente imbricada con los campos anteriores, y con el potencial de cambiar de forma drástica

dualities with gravitational systems.

The IFT has always been a main actor in the study of QCD, both at the mathematical level, as well as with dedicated numerical codes. This type of anlysis is essential in the comparison of theoretical calculations with experimental results in the Physics of heavy quarks, one of the main windows to Physics beyond the Standard Model.

In the area of collective phenomena in Condensed Matter and Quantum Information, the IFT is world-competitive in the theoretical design of quantum simulators, cold atom systems in laser optical lattices simulating the dynamics of condensed matter systems, eventually with possible applications to Quantum Computing.

In systems where analytic methods or numerical simulations are challenged, like strongly coupled systems, or systems with substantial time evolution, the IFT develops intense research with significant results, in the use of holographic dualities with gravitational systems. There are established research lines analyzing the dynamics of thermalization of strongly interacting plasmas, the computation of quantum entanglement and its geometrical interpretation, and transport phenomena in exotic materials like semimetals and topological insulators.

Research in this domain is the most multidisciplinary of all, connecting to the three previous areas as a tool for calculation, but also as a source of new formal ideas to address outstanding classic problems in physics, such as the problem of quark confinement in high-energy physics, the problem of high-T superconductivity in condensed matter physics, or the development of core ideas for future quantum technologies.

Strings and quantum gravity

This represents a more speculative domain of research, in which the quantum nature of gravity becomes relevant. The unification of matter and space-time has emerged as a realistic target for theoretical physics in the XXI century, largely pumped by the development of string theory in the last three decades, and more recently through the emergence of the idea of holographic dualities between black hole type gravitational solutions and strongly coupled many-body systems. This is certainly an open-ended and speculative exploration, but also one which is closely intertwined with the above-discussed fields, and which has the potential to change our understanding of the

nuestra concepción del Universo.

La actividad del IFT se centra principalmente en la propuesta de modelos de Física de Partículas en teoría de cuerdas, en el estudio de agujeros negros y su dinámica a nivel cuántico, y en la aplicación de dualidades holográficas a sistemas en acoplamiento fuerte, ya descritos en el apartado anterior.

Además de sus aplicaciones a Cosmología en modelos de inflación, el IFT es pionero en la teória de cuerdas aplicada a Física de Partículas, especialmente en términos de los solitones no perturbativos denominados D-branas, y sus generalizaciones en teoría F. Estos modelos permiten el estudio de mecanismos de ruptura de supersimetría y el cálculo del espectro de partículas supersimétricas para su posible confrontación con resultados experimentales futuros del LHC.

En cuestiones más teóricas, relacionadas con la naturaleza cuántica de la gravitación, el IFT tiene abiertas potentes líneas de investigación en fundamentos de la holografía, estudio de agujeros negros supersimétricos, y nuevos modelos de agujeros negros cuánticos, en términos de condensados de Bose-Einstein de gravitones en régimen de criticalidad cuántica.

El grupo del IFT ha disfrutado de dos proyectos ERC en la modalidad Avanzada en este campo. Asimismo, este área de investigación está en contacto directo con los principales grupos a nivel mundial, a través de colaboraciones o del establecimiento de redes europeas, como la reciente red COST "The String theory Universe", en el que coordinó el grupo de trabajo sobre Física de Partículas en teoría de cuerdas.

Tomando en perspectiva estos campos, el IFT se encuentra en la vanguardia de la fascinante aventura del conocimiento de la Naturaleza en su nivel más fundamental, que abre a la nueva generación de jóvenes investigadores, y de la que hace partícipe a la sociedad en general.

Universe.

The IFT activity focuses on the construction of Particle Physics models in string theory compactifications, in the study of black holes and their possible dynamics at the quantum level, and the application of holographic dualities to strongly coupled systems, as mentioned above.

Beyond their application to Cosmology and inflation models, the IFT pioneers the use of string theory to build models of Particle Physics, specially in terms of non-perturbative solitons, such as D-branes and their F-theory generalization. These models allow the study of supersymmetry breaking mechanisms and the computation of superpartner spectra for eventual comparison with future experimental results from the LHC.

In the more theoretical realm of quantum nature of gravity, the IFT has strong research lines on the foundations of holography, the construction and classification of supersymmetric black hole solutions in supergravity theories, and novel models for quantum black holes in terms of Bose-Einstein condensates of gravitons at quantum criticality.

The IFT group has had two Advanced ERC grants in this field. It is also directly connected with the main research groups at world level, both through individual collaborations and also through EU networks, like the recent COST Action "The String theory Universe", in which it coordinated the Working Group on Particle Physics models in string theory.

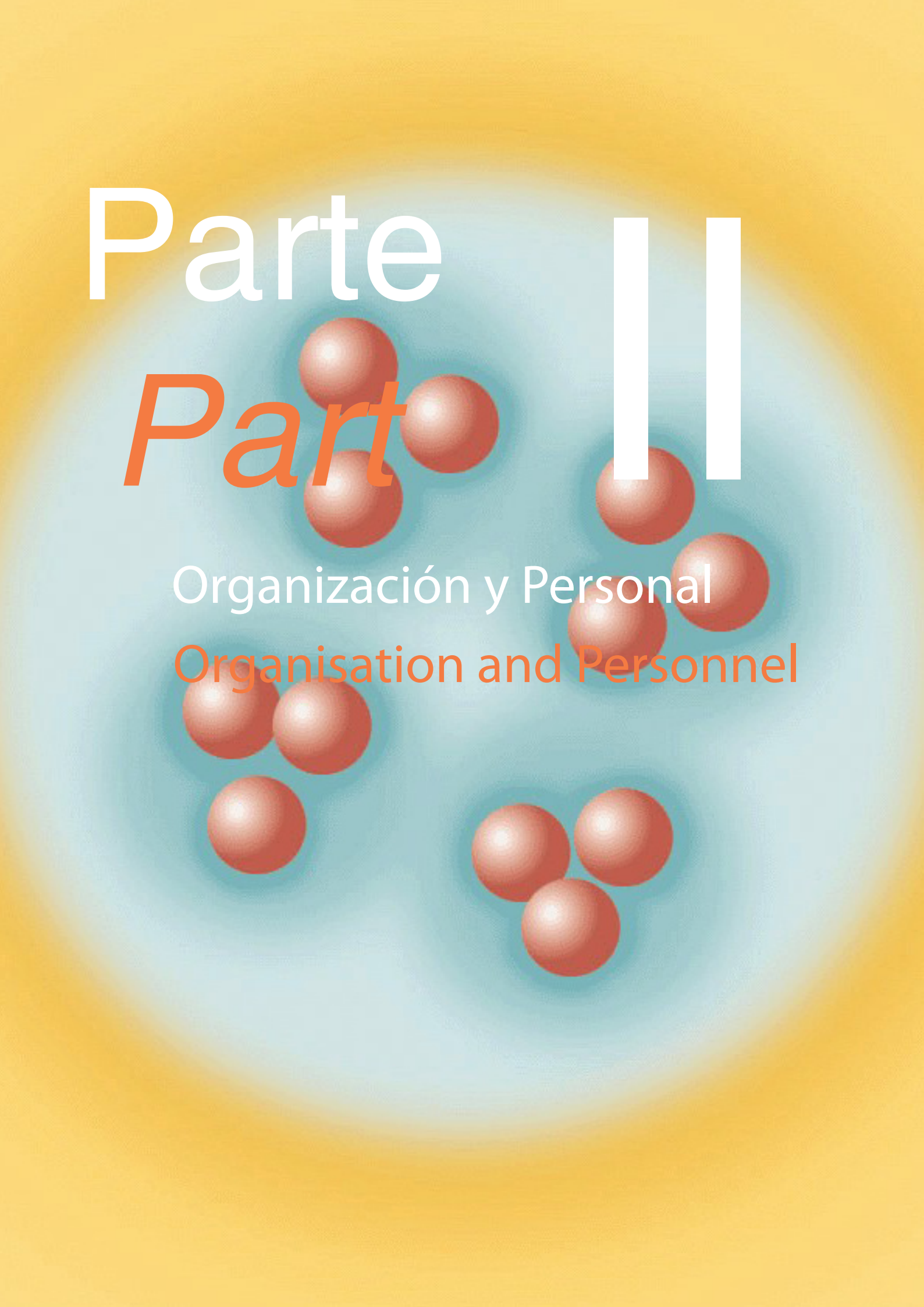
In a general perspective of its activity in all these fields, the IFT is positioned at the frontier in the fascinating adventure of understanding Nature, training younger generations and sharing it with the society in general.

Parte II

Part

Organización y Personal

Organisation and Personnel



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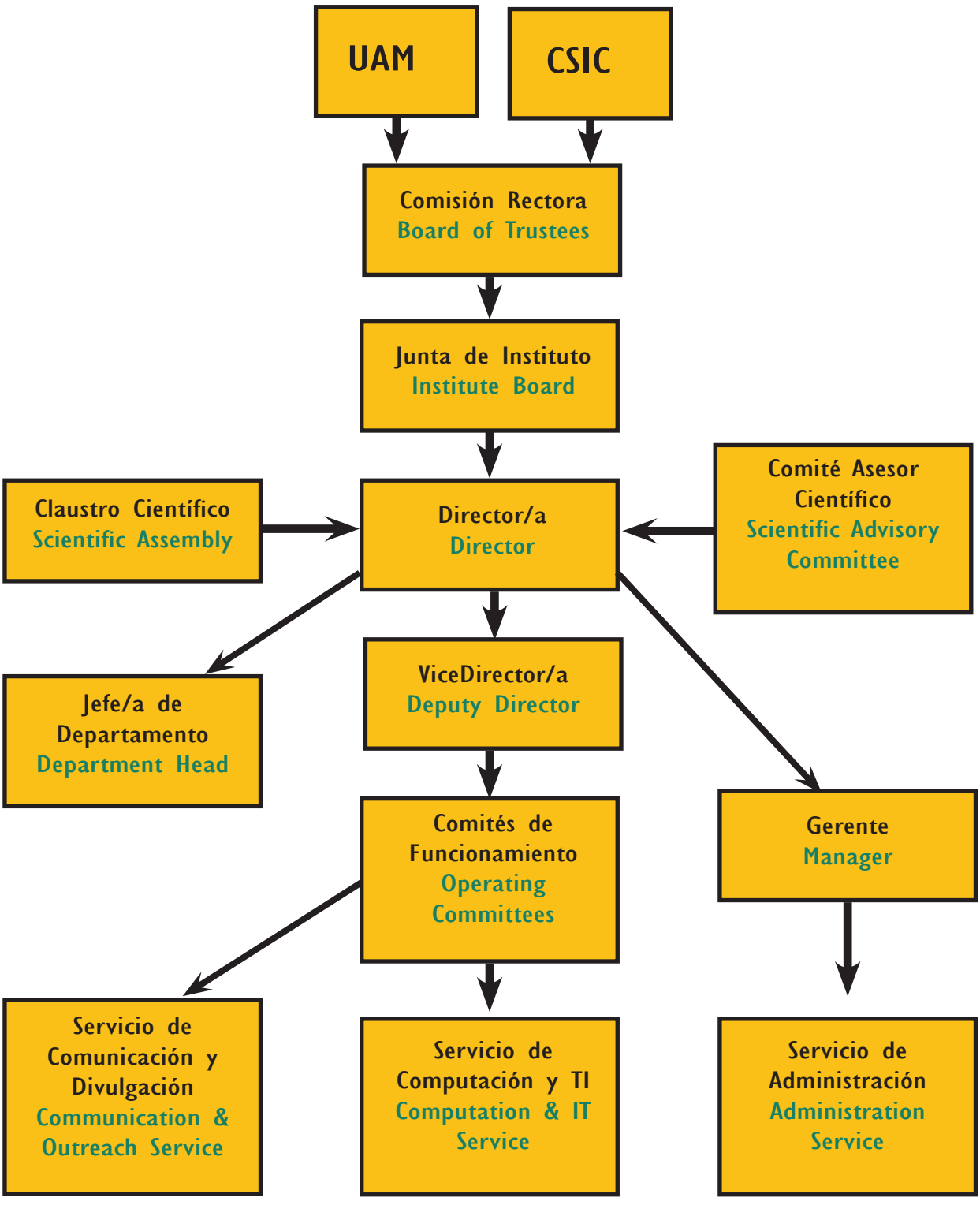
Organización
Organization



El IFT dispone de personal científico y de personal de servicios técnicos y administrativos. El personal científico está formado por miembros permanentes que son profesores de la UAM o investigadores del CSIC, por investigadores Ramón y Cajal, por investigadores posdoctorales y por estudiantes de doctorado. El personal de servicios se organiza en tres unidades: Servicio de Computación y Tecnologías de la Información (TI), Servicio de Comunicación y Divulgación y Servicio de Administración. En cuanto al equipo de gerencia, este es común a los dos institutos que comparten el edificio, el IFT y el Instituto de Ciencias Matemáticas (ICMAT), constituyendo el centro de servicios del CFTMAT.

El personal científico del IFT se estructura en dos departamentos: Departamento de Teoría y Departamento de Fenomenología y Cosmología. El primero está formado por los investigadores que trabajan en los aspectos más formales o matemáticos de la física teórica, mientras que el segundo lo conforman los investigadores más directamente relacionados con los datos experimentales u observacionales

El IFT se rige por el convenio específico de colaboración firmado el 9 de Marzo de 2011 por sus dos instituciones, la UAM y el CSIC. En el mismo se recogen los siguientes Órganos de Gobierno y Asesoramiento:

- Órgano Rector: Comisión Rectora.
- Órganos de Dirección y Gestión: Junta del IFT, director/a, vicedirector/a, gerente.
- Órganos de Asesoramiento: Claustro Científico, Comité de Asesoramiento Externo.

La Comisión Rectora

Es el órgano de dirección superior del IFT y sus funciones incluyen aprobar el plan estratégico cuatrienal y el presupuesto del IFT. Sus miembros no pueden tener la condición de personal adscrito al instituto. Actualmente está integrada por el Vicepresidente de Organización y Relaciones Institucionales del CSIC y el Jefe de la Comisión de Área de Ciencia y Tecnologías Físicas del CSIC, y por el Vicerrector de Investigación e Innovación de la UAM y el Gerente de la UAM. El director del IFT asiste a las reuniones de la Comisión Rectora. El/La gerente del IFT actúa como Secretario/a.

The IFT has a scientific, technical and administrative personnel. The scientific staff consists of permanent members who are professors or researchers of UAM or CSIC, fixed term Ramón y Cajal researchers, postdoctoral researchers and PhD students. The technical and administrative personnel is organized into three different units: Computing and Information Technology (IT) Unit, Administration Unit, and Communications and Outreach Unit. The Management team is common to the two institutes sharing the building, the IFT and the Institute of Mathematical Sciences (ICMAT), and constitutes the Center of Theoretical Physics and Mathematics (CFTMAT) service center.

For the purposes of scientific organization, the IFT is divided into two departments: Department of Theory and Department of Phenomenology and Cosmology. The former includes researchers working in more formal or mathematical aspects of theoretical physics, while the latter gathers researchers whose work is more directly related to experimental or observational data.

The IFT is governed through the specific collaboration agreement signed on March 9, 2011 by its two host institutions, UAM and CSIC. It defines the Governing and Advisory Bodies

- Governing Body: Board of Trustees.
- Management Bodies and Management: IFT Board, Director Vicedirector, Manager.
- Advisory Bodies: Scientific Assembly, External Advisory Committee.

The Board of Trustees

It is the superior executive board of IFT and among its duties it approves the four-year strategic plan of the institute as well as its budget. Its members cannot have the status of staff assigned to the institute. It is currently composed of the Vice-president of Organization and Institutional Relations CSIC and the Head of the Area of Physics Science and Technology of CSIC, and the Vice President for Research and Innovation of UAM and the Manager of the UAM. The IFT director attends meetings of the Governing Committee. The manager of IFT acts as Secretary.

La Junta del IFT

Está constituida por el/la director/a del IFT, el/la vicediretor/a del IFT, los jefes de departamento y dos representantes del personal. El/La gerente del IFT actúa como Secretario/a
El/La director/a
Sus funciones son las de dirigir, coordinar y supervisar todos las actividades y servicios del IFT, así como ejecutar los acuerdos de la Junta. Su mandato es por un período de tres años, pudiendo ser reelegido.

El/La vicedirector/a

Asiste al/a la director/a en sus funciones. Le sustituye en caso necesario o en funciones delegadas.

El/La gerente

Le corresponde la gestión administrativa y económica del instituto.

El Claustro Científico

Está compuesto por el personal investigador y los doctores adscritos al IFT. Entre sus misiones le corresponde proponer a la Junta las directrices y medidas necesarias para el desarrollo de la actividad científica del IFT.

El Comité de Asesoramiento Externo

Compuesto por científicos de relieve internacional que realizan un seguimiento de la labor científica del IFT.

The IFT Board

It consists of the director and vicedirector of the IFT, the department heads and two staff representatives. The manager of IFT acts as Secretary .
The Director
The Director´s functions are to direct, coordinate and supervise all the activities and services of IFT and to implement the resolutions of the IFT Board. Its mandate is for a period of three years with the possibility of reappointment.

The Deputy Director

He/she assists the director in office. and replaces the director if necessary or when suitable functions are delegated.

The Manager

He/she is responsible for administrative and financial management of the Institute.

The Scientific Assembly

It consists of the research staff and doctors assigned to IFT. Its mission is to propose to the Board the guidelines and means necessary for the development of the scientific activity of IFT.

The External Advisory Committee

It is composed of international renowned scientists that track the scientific work of the IFT.

La composición de la Junta del IFT en 2019-2020 es: The composition of the IFT board in 2019-2020 is

Junta / Board	
Cargo / Responsability	
Director / Director	Luis E. Ibáñez
Vicedirector / Deputy Director	José L. Fernández Barbón
Jefe de Departamento. de Teoría / Head of Theory Department	Angel M. Uranga
Jefa de Departamento de Fenomenología y Cosmología / Head of the Phenomenology and Cosmology Department	María José Herrero
Representantes de personal / Representatives of the personnel	Esperanza López Alberto Casas

El Comité de Asesoramiento Externo fue renovado en 2019. Actualmente está formado por los siguientes prestigiosos científicos:

The external advisory committee was renovated in 2019. It is presently composed of the following distinguished scientists:

Comité Asesoramiento Externo / External Advisory Committee	
Luis Álvarez Gaumé	Director del Simons Center for Geometry and Physics, Stony Brook, Ex-Director y miembro del Grupo de Teoría del CERN Director of the Simons Center for Geometry and Physics, Stony Brook Former head and staff member of Theory Group at CERN
Alessandra Buonnano	Directora del Max Planck Institute for Gravitational Physics, Potsdam Director of the Max Planck Institute for Gravitational Physics, Potsdam
Graciela Gelmini	Universidad de California, Los Angeles/ University of California Los Angeles
Luciano Maiani	Presidente del CNR (Consiglio Nazionale delle Ricerche) Director General del CERN (1999-2003) Presidente del INFN (Inst. Nazionale di Fisica Nucleare), 1993-98) President of CNR Director General CERN (1999-2003 President of INFN (1993-98)
Michelangelo Mangano	Grupo de Teoría del CERN Director del Centro de Física del LHC / CERN Theory Groupy Head of the LHC Physics Center
Fernando Quevedo	Cambridge University Director del Centro Internacional del Física Teórica (ICTP) (2009-2019) / Cambridge University Director of International Centre for Theoretical Physics (ICTP) (2009-2019)

Los comités de funcionamiento son los siguientes

The operating committees are

Comités de Funcionamiento / Operating Committees	
Igualdad, Diversidad e Inclusión / Equity, Diversity and Inclusion	Esperanza López (Coordinadora/Head) Rebeca Alameda, Emilio Ambite, Daniel Areán, Fernando Arias, Pilar Coloma, Viviana Gammaldi, Margarita García-Pérez, Donald Kpatcha, Matteo Martinelli, Luca Merlo, Raquel Santos, Angel Uranga
Estudios de Posgrado / Postgraduate Studies	Maria José Herrero, Esperanza López, Jesús Moreno, Carlos Pena, Agustín Sabio Vera
Contratos Posdoctorales / Postdoctoral Positions	Juan García-Bellido Jesús Moreno Angel Uranga
Divulgación / Outreach	Ángel M. Uranga (Coordinador/Head) José L.F. Barbón, Alberto Casas, Susana Hernández, Carlos Pena, Germán Sierra
Seminarios y Coloquios / Seminars and Colloquia	José L.F. Barbón (Coordinador/Head) Sven Heinemeyer, Esperanza López, Gregorio Herdoíza, Michele Maltoni, Luca Merlo, Savvas Nesseris, María J. Rodríguez, Oscar Varela
Congresos y Programas / Workshops and Programs	José L.F. Barbón (Coordinador/Head) Juan García-Bellido, Angel Uranga
Biblioteca / Library	Enrique Álvarez, José L. F. Barbón
Administración del Cluster / Cluster Administration	Carlos Pena
Memorias científicas / Scientific Reports	Susana Hernández, Angel Uranga

Servicio de Computación y Tecnología de la Información
Este servicio es responsable de la gestión de los recursos de tecnología de la información del Instituto. Una de sus tareas más fundamentales y complejas es la gestión de los recursos de Computación de alto rendimiento (HPC). Estos son esenciales para el desarrollo de buena parte de la investigación en el IFT. Sus tareas también incluyen: manejo de los equipos informáticos de uso individual de pequeña escala, gestión de los recursos de uso general, como impresoras y redes, desarrollo y gestión de la página Web del IFT, y de su potente intranet que permite el acceso selectivo a servicios e información.

Computing and Information Technology
This service is responsible of the management of the information technology resources of the institute. One of its most fundamental and complex tasks is the management of the available high-performance computing (HPC) resources. These are essential for the development of a good fraction of the research taking place at the Institute. Other important tasks carried out by this service are: handling of the individual-use small scale computer equipment, management of general use resources, such as printers and networks, development and management of the IFT webpage, and of its powerful intranet allowing selective access to services and information

Computación y TI / Computing and IT
Andres Díaz-Gil (until 15/03/2019)
Marcos Ramírez (until 31/12/2019)
Emilio Ambite

Servicio de Comunicación y Divulgación
El IFT tiene una amplia tradición en la transferencia de conocimiento a la sociedad. Organizamos muchas actividades de divulgación dirigidas al público en generall y al sector de enseñanza secundaria o de grado: cursos de formación, charlas públicas, participación en medios de comunicación, publicación de libros, etc. Un ejemplo es el taller interactivo internacional en Física de Partículas, o la producción de vídeos para nuesto exitoso canal de Youtube. Además colaboramos con entidades de primer nivel como el Museo Thyssen-Bornemisza, la Residencia de Estudiantes CSIC, el Museo Nacional de Ciencia y Tecnología, etc, así como los departamentos de Cultura Científica y Divulgación del CSIC, UAM y de la Comunidad de Madrid

Communication and Outreach Service
The IFT has a very strong tradition in knowledge transfer of its research to broader audiences. We organize many outreach activities addressed to general public and also to High School students and teachers or undergraduate students. They include: training courses, public talks, participation in media, publication of books, etc. An illustrative example is the International Master class in Particle Physics, or the production of outreach videos for our extremely successful Youtube channel. We also have collaborations with top-class entities like the Thyssen-Bornemisza Museum, the CSIC Residencia de Estudiantes, the National Museum of Science and Technology, as well as with the Outreach Departments of CSIC, UAM and Community of Madrid.

Comunicación y Divulgación / Communication and Outreach	
Responsable / Head	Susana Hernández

Servicio de Administración
El objetivo de este servicio es el mantenimiento de la estructura administrativa del IFT de acuerdo con los más altos estándares de eficiencia, el uso óptimo de los recursos y la planificación racional. Este servicio es de vital importancia para que el instituto pueda lograr sus objetivos científicos, dada la intensa actividad desarrollada como la contratación de investigadores posdoctorales y predoctorales, la organización de seminarios, coloquios, talleres, programas de investigación o la gestión de visitas y viajes.

Administration Service
The goal of this service is to maintain the administrative structure of the institute according to the highest standards of efficiency, optimal use of resources and rational planning. This service is of crucial importance in order for the institute to achieve its scientific goals, given the intense activity developed, such as the hiring of postdoctoral and predoctoral researchers, the organization of seminars, colloquia, workshops, and research programs or the administration of visits and travels.

Administración / Administration	
Jefa / Head	Isabel Pérez
Visitantes y Congresos / Visitors and Workshops Viajes y Recursos Humanos / Travel, HHRR	Mónica Vergel Rebeca Alameda
Gestión proyectos "Invisibles Plus", "Elusives" / "Invisibles Plus", "Elusives" Grant Managers	Rebeca Bello (until 31/01/2019) Chabely Rubiera Prats (until 31/03/2020)
Apoyo / Support	Laura Pueyo (10/04/2019 - 31/05/2020)

Servicios del CFTMAT
El CFTMAT proporciona servicios comunes a los dos institutos IFT e ICMAT situados en el edificio.

CFTMAT
The CFTMAT provides common services for the two institutes located in the building, the IFT and the ICMAT.

Servicios del CFTMAT / CFTMAT Services	
Gerente / Manager Pagadora / Accountant	Miguel Anchuelo María José Caballero
Apoyo / Support	Elena Barreda, María Hortal (until 31/12/2019) Iván Cosio (after 31/12/2019)
Director Biblioteca / Library Director	Ricardo Martínez
Mantenimiento / Maintenance Recepción, Seguridad / Reception, Security Limpieza / Cleaning	

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Personal Investigador
Research Personnel

CU	Catedrático de Universidad / University Professor (UAM)
PT	Profesor Titular / Associate Professor (UAM)
PI	Profesor de Investigación / Research Professor (UAM)
IC	Investigador Científico / Senior Researcher (CSIC)
CT	Científico Titular / Staff Researcher (CSIC)
PCD	Profesor Contratado Doctor / Contract Professor (UAM)
BG	Investigador Beatriz Galindo/ Beatriz Galindo Fellow
RyC	Investigador Ramón y Cajal / Ramon y Cajal Fellow

Personal Investigador / Staff Members		
Apellido / Family Name	Nombre /First Name	Categoría /Position
Álvarez	Enrique	CU
Barbón	José Luis	IC
Casas	Alberto	PI
Cerdeño	David G.	BG (since 15/05/2020)
Coloma	Pilar	RyC (since 01/05/2020)
De Rújula	Alvaro	Contract
Espinosa	José Ramón	PI
Fernández Martínez	Enrique	PCD
García Pérez	Margarita	CT
García-Bellido	Juan	CU
Gavela	Belén	CU
Gómez	César	PI
González-Arroyo	Antonio	CU
Heinemeyer		PI
Herdoíza	Gregorio	RyC, PCD (since 24/02/2020
Herrero	María José	CU
Ibáñez	Luis E.	CU
Landsteiner	Karl	CT
López	Esperanza	IC
Maltoni	Michele	CT
Marchesano	Fernando	CT
Merlo	Luca	RyC
Moreno	Jesús	CT
Muñoz	Carlos	CU
Nesseris	Savvas	RyC
No	José Miguel	RyC (since 01/09/2019)
Ortín	Tomás	PI
Pena	Carlos	TU
Poves	Alfredo	CU
Rodríguez	María José	RyC
Sabio Vera	Agustín	PCD
Sierra	Germán	PI
Uranga	Ángel	PI
Varela	Óscar	RyC

En excedencia / Onleave		
Apellido / Family Name	Nombre / First Name	Obs / Obs
Blennow	Mattias	RyC
Paredes	Belén	CT

Investigadores Atracción de Talento / Talent Attraction Research Fellows		
Apellido / Family Name	Nombre / First Name	Obs / Obs
Areán	Daniel	
Arganda	Ernesto	since 01/09/2020
Ballesteros	Guillermo	
Benincasa	Paolo	since 01/09/2020
Fasiello	Matteo	since 01/09/2020
Kuroyanagi	Sachiko	since 01/09/2020
No	José Miguel	became RyC in 01/09/2019
Sánchez Conde	Miguel Ángel	

Profesores visitantes / Long-term visiting professors		
Apellido / Family Name	Nombre / First Name	Obs / Obs
Aguilar-Saavedra	Juan Antonio	01/03/2019 - 29/02/2020

Investigadores posdoctorales / Postdoctoral researchers		
Apellido / Family Name	Nombre / First Name	Financiación / Funding
Ávila	Santiago	Intertalentum UAM MSCA
Baggioli	Matteo	Severo Ochoa
Baume	Florent	Severo Ochoa
Boudad	Mathieu	La Caixa Junior Leader funds
Braglia	Matteo	Atracción de Talento funds
Bussone	Andrea	FPA
Cardona	Wilmar	Severo Ochoa
Céspedes	Sebastián	Severo Ochoa

Corvilain	Pierre	Severo Ochoa
Chakraborti	Manimala	Severo Ochoa
Déctor	Aldo	Mexican Grant
Fleury	Pierre	La Caixa Junior Leader MSCA
Flory	Mario	FPA
Frison	Julien	Severo Ochoa
Fuchs	Michael	ERC, Severo Ochoa
Gaggero	Daniele	La Caixa Junior Leader MSCA
Gammaldi	Viviana	Juan de la Cierva
García García	Claudia	Ramón y Cajal funds
García García	Marcos	Severo Ochoa
Giardino	Pierpaolo	Severo Ochoa
Houtz	Rachel	Elusives, Severo Ochoa
Jiang	Yun	Atracción de Talento funds
Jiménez	Amadeo	Atracción de Talento funds
Lacroix	Thomas	Intertalentum UAM MSCA
Martinelli	Matteo	La Caixa Junior Leader MSCA
Moliné	Ángeles	Atracción de Talento funds
Montanari	Francesco	Severo Ochoa
Morales	Roberto	FPA
Ota	Toshihiko	EU Grant
Pierre	Matthias	FPA, Severo Ochoa
Pieroni	Mauro	Intertalentum UAM MSCA
Romano	Luca	Severo Ochoa
Singha Roy	Sudipto	Severo Ochoa, QUITEMAD
Sinha	Ritam	FPA
Sousa	Kepa	ERC
Zaldívar	Bryan	Atracción Talento Grant

Investigadores predoctorales / Predoctoral researchers

Apellido / Family Name	Nombre / First Name
Aguirre Santaella	Alejandra
Alonso	Javier
Arco	Francisco
Arias	Fernando
Arjona	Rubén
Bethencourt	Nauzet
Biekötter	Thomas
Bonilla	Jesús
Boscá	Víctor
Bris	Alejandro
Bultrini	Daniel
Buratti	Ginevra
Butti	Pietro
Calderón	José
Campos	Manuel
Cano Molina-Niñirola	Pablo
Cano Molina	José Manuel
Castellano	Alberto
Cesaro	Mattia
Conigli	Alessandro
Copetti	Christian
Coronado	Javier
Dasilva	Jorge
Delgado	Matilda
de la Rosa	Martín
Elgood	Zachary
Escobar	Dagoberto
Espinosa	Llorenc
Ezquiaga	José María
Fernández Pendás	Jorge
Fornieri	Ottavio
García García	Claudia
García Martín	Diego
García-Valdecasas	Eduardo
Gehrlein	Julia
Gilbert	Jonathan
González López	Manuel
Gonzalo Badía	Eduardo
Hernández	Nelson

Investigadores predoctorales / Predoctoral researchers

Herráez	Álvaro
Hogg	Natalie
Hunter	Max
Ibáñez Bribián	Eduardo
Jaraba	Santiago
Kpatcha	Donald
Lara	Iñaki
Larios	Gabriel
Letschka	Raoul
Martín García	Javier
Martín Ramiro	Pablo
Medrano	Diego
MIlans del Bosch	Guillermo
Mininno	Alessandro
Morales	Sergio
Murcia	Ángel
Pereñíguez	Daniel
Pérez Romero	Judit
Prieto	David
Quílez	Pablo
Quilis	Javier
Quirant	Joan
Rey	Julián
Reyes	Guillermo
Riquelme	Walter
Romero Jurado	José Ángel
Rosauro	Salvador
Ruipérez	Alejandro
Sáez	Alejandro
Samos	Nadir
Santos	Raquel
Sasieta	Martín
Scarcella	Francesca
Sopena	Alejandro
Schwieger	Sebastian
Stoppacher	Doris
Trashorras	Manuel
Ugarrio	Javier
Vos	Bernhard
Wiesner	Max
Zatti	Matteo

Parte III

Part

Infraestructura

Infrastructure

6

Edificio
Building

Desde enero de 2011 el IFT ocupa un ala de un edificio de nueva construcción en el campus de la Universidad Autónoma de Madrid. El IFT, junto con el Instituto de Ciencias Matemáticas (ICMAT) que ocupa el otro ala, conforma el Centro de Física Teórica y Matemáticas CFTMAT. Ambos comparten las áreas comunes que acogen una biblioteca, cafetería, auditorio, aulas de seminarios y docencia, centro de procesamiento de datos, Recepción y Gerencia.

El edificio, de 6 plantas, cuenta con instalaciones totalmente modernas. Ofrece despachos individuales para todos los investigadores permanentes y Ramón y Cajal, oficinas de ocupación doble para investigadores pos-doctorales y despachos de ocupación cuádruple para estudiantes de doctorado. Asimismo hay despachos para visitantes y participantes en los congresos y programas del IFT . El equipo de computación científica y la biblioteca están en el sótano.

El edificio dispone de varias salas de conferencias con equipamiento audiovisual del más moderno nivel técnico. El IFT tiene su propia sala de seminarios con una capacidad de 80 plazas, denominada Sala Roja. Asimismo, y de forma compartida por el IFT y el ICMAT, cuenta con una sala de conferencias con una capacidad de 150 plazas, la Sala azul, y tres aulas más pequeñas con capacidad entre 20 y 30 plazas. La Sala Azul se utiliza para talleres y conferencias más grandes mientras las aulas más pequeñas se usan para las clases del programa de Master en Física Teórica, y para discusiones científicas. Por ultimo, un auditorio situado entre las dos alas de el edificio y un aforo de 250 plazas permite la celebración de congresos de elevado número de participantes. Por ejemplo, la reunión inaugural del IFT en diciembre de 2011, o los congresos "String Phenomenology 2015" , "Invisibles 2015" o PASCOS 2017.

Since January 2011 the IFT occupies a wing a new building on the campus of Universidad Autónoma de Madrid. The IFT, together with the Institute of Mathematical Sciences (ICMAT) on the other wing, forms the Center for Theoretical Physics and Mathematics CFTMAT. Both share common areas including a large auditorium, seminar and teaching rooms, a library, cafeteria, computer centre, Reception and Management.

The 6-floor building features world class infrastructure. It offers single occupancy offices for all permanent and Ramón y Cajal researchers, double occupancy offices for postdoctoral researchers and quadruple occupancy offices for PhD students. There are also offices for visiting professors, and workshop participants. The High Performace Computing equipment and the library are located at the basement level.

There are several lecture halls with state of the art audiovisual equipment. IFT has its own seminar room with a capacity of 80 seats, known as the Red Room. A larger conference room with a capacity of 150 seats, the Blue Room, and three smaller lecture halls with capacities of 20-30 seats are jointly used by IFT and ICMAT. The Blue Room is used to host larger workshops and conferences whereas the smaller rooms are used for the lectures in the Master program in Theoretical Physics. Finally a large 250-seats lecture hall in the central area of the building can host large conferences. For instance, the IFT inaugural meeting in December 2011, and the conferences "String Phenomenology 2015", "Invisibles Workshop 2015", and PASCOS 2017.

La gran sala de conferencia durante el el congreso inaugural del nuevo edificio del IFT en 2011.

The large conference hall during the inaugural conference of the IFT new premises in 2011.

Arriba a la izquierda: Sala Azul, con aforo de 150 plazas, utilizada para coloquios, congresos y reuniones de tamaño medio.

Arriba a la derecha: Seminario en la Sala Roja del IFT Tiene una capacidad de 80 plazas y es el lugar de nuestros seminarios semanales.

Izquierda: Biblioteca de Física y Matemáticas "Jorge Juan del CFTMAT:

Upper left: 150-seats Blue Room is used for IFT colloquia, larger workshop or medium sized conferences.

Upper right: IFT seminars are usually hold in the IFT 80-seats Red Room.

Left: ¨The CFTMAT Physics and Mathematics Library "Biblioteca Jorge Juan":

7

Computación
Computing

El cluster HYDRA de tipo Beowulf del IFT/
The Beowulf type cluster HYDRA at IFT

El edificio IFT está equipado con un moderno Centro de Procesamiento de Datos (CPD) con capacidad para varios equipos de computación de alto rendimiento (HPC) unidades. El CPD tiene unos 70m^2, y su equipamiento cuenta con: suelo técnico elevado, máquinas de climatización y húmedad redundantes, un sistema de alimentación ininterrumpida que proporciona 150Kvas de potencia, un grupo electrógeno y un sistema de extinción de incendios por gas.

Estas instalaciones de Computación Científica son esenciales para varias líneas de investigación en Física Teórica, por ejemplo cálculos de precisión en el Modelo Estándar o sus extensiones, predicciones de nueva Física en el LHC, simulación y estudio de estructuras a gran escala en el Universo, etc. Algunos de los principales equipos del IFT son:

- El cluster Hydra, adquirido en 2009. Inicialmente se componía de 34 nodos Intel® Xeon® E5540 y se completó en 2011 y 2012 con dos blades con18 nodos (Intel® Xeon® E5645 and Intel® Xeon® E5-2640) El sistema incluye un sistema de almacenamiento LUSTRE que permite un servicio de datos en paralelo a los nodos, capaz de soportar flujos intensos de lectura/escritura. El sistema se completa con una red Infiniband. Hydra es en la actualiada la principal instalación de computación científica del IFT, con aproximadamente 80 usuarios registrados. Su contribución a los resultados de investigación del IFT se refleja en las varias docenas de publicaciones que presentan resultados obtenidos con Hydra, y que acumulan más de un millar de citas.

- El cluster Galilea, de los proyectos PAU y DES, que consiste en 4 Unidades de Procesamiento Gráfico Tesla C2070, con 448 cores de procesamiento CUDA cada una , y una memoria compartida con 160 cores Intel(R) Xeon(R) y 1 TB de RAM.

La financiación para la adquisición de estos equipamientos proviene de varios proyectos de investigación del IFT, el Plan Estratégico del CSIC, la Comunidad de Madrid y el proyecto Severo Ochoa.

Además de estos recursos locales, el IFT ha participado en varias solicitudes de tiempo de máquina en instalaciones de computación a gran escala, a través del Consorcio PRACE y de la Red Española de Supercomputación. Como resultado, los grupos del IFT han participado en iniciativas que suman más de 100

The IFT building is equipped with a modern Center for Data Processing (DPC) with capacity for several High Performance Computing (HPC) units. The CPD has a size of approximately 70m^2, including its equipment features: high technical ground, machines and redundant climate humidity , an uninterruptible power supply that provides power 150Kvas, a generator and a system of fire extinguishing gas.

These HPC resources are key facilities to several areas of research in Theoretical Physics --- including precision calculations in the Standard Model and its possible extensions, predictions for New Physics searches at the Large Hadron Collider, simulations and studies of the Large Scale Structure of the Universe, etc. Some of the existing machines currently run by our group are:

- The Hydra general-purpose cluster, acquired in 2009. It was was composed originally of 34 nodes (Intel® Xeon® E5540), and was upgraded in 2011 and 2012 with two additional blades consisting of 18 nodes (Intel® Xeon® E5645 and Intel® Xeon® E5-2640). The system includes a LUSTRE storage system that allows to serve a high performance parallel file system to the computer nodes, capable of withstanding intense read/write processes. The solution is completed with an Infiniband network. Hydra has been the main local computational asset at IFT during recent years (around 80 registered users at present), contributing substantially to the IFT research outcome: since 2012, these resources are acknowledged in dozens of publications, with a total above one thousand citations.

- The cluster Galilea, from the PAU and DES Surveys, consisting of 4 Tesla C2070 Graphics Processing Units (GPU), with 448 CUDA processing cores each, and a shared memory machine with 160 Intel(R) Xeon(R) cores and 1 TB of RAM.

The funding to acquire these computing resources has been jointly provided by several IFT R&D grants, the Strategic CSIC Plan, the Madrid Regional Government, and the Severo Ochoa Excellence Program.

In addition to these local resources, our group has participated in several successful applications for resources in large-scale HPC facilites, both through the European PRACE Consortium and through the Spanish Supercomputation Network. As a result, we have been involved in efforts totalling well above 100 million cpu hours at the main HPC centers in Europe (JUQUEEN, SuperMUC and HLRN in Germany; Fermi and Gali-

millones de horas de CPU en los principales centros de Computación en Europa (JUQUEEN, SuperMUC y HLRN en Alemania; Fermi y Galileo en Italia; MareNostrum, Altamira y FinisTerrae en España; etc.)

Además del potente equipamiento de Computación Científica, el IFT dispone de una rica infraestructura de tecnología de la información, que sostiene su actividad de investigación y automatiza diversos procesos administrativos: trámites administrativos en la intranet del IFT, tramitación de solicitudes de puestos predoctorales y postdoctorales (aproximadamente 400 solicitudes postdoctorales por año), organización de seminarios y workshops, la nube de almacenamiento del IFT, y la nueva Web del IFT y sus servicios. Todas las infraestructuras mencionadas se basan en servidores VPS albergados en dos sistemas de virtualización adquiridos con fondos del proyecto Severo Ochoa.

Los detalles sobre los recursos de HPC y de gestión se pueden encontrar en la página web:
http://www.ift.uam-csic.es/hydra/

leo in Italy; MareNostrum, Altamira and FinisTerrae in Spain; etc.).

In addition to the HPC equipment, the IFT enjoys a rich information technology infrastructure that supports the research activity and automates various aspects of IFT everyday life: management and administration tasks via the IFT intranet; management software for predoctoral and postdoctoral applications (every year we receive over 400 of the latter); software for seminar and workshop organisation; the IFT storage cloud; and most importantly the IFT Web sites and Web services. All the mentioned infrastructure is based on VPS servers hosted on two systems of virtualisation acquired with funds of the SO Programme.

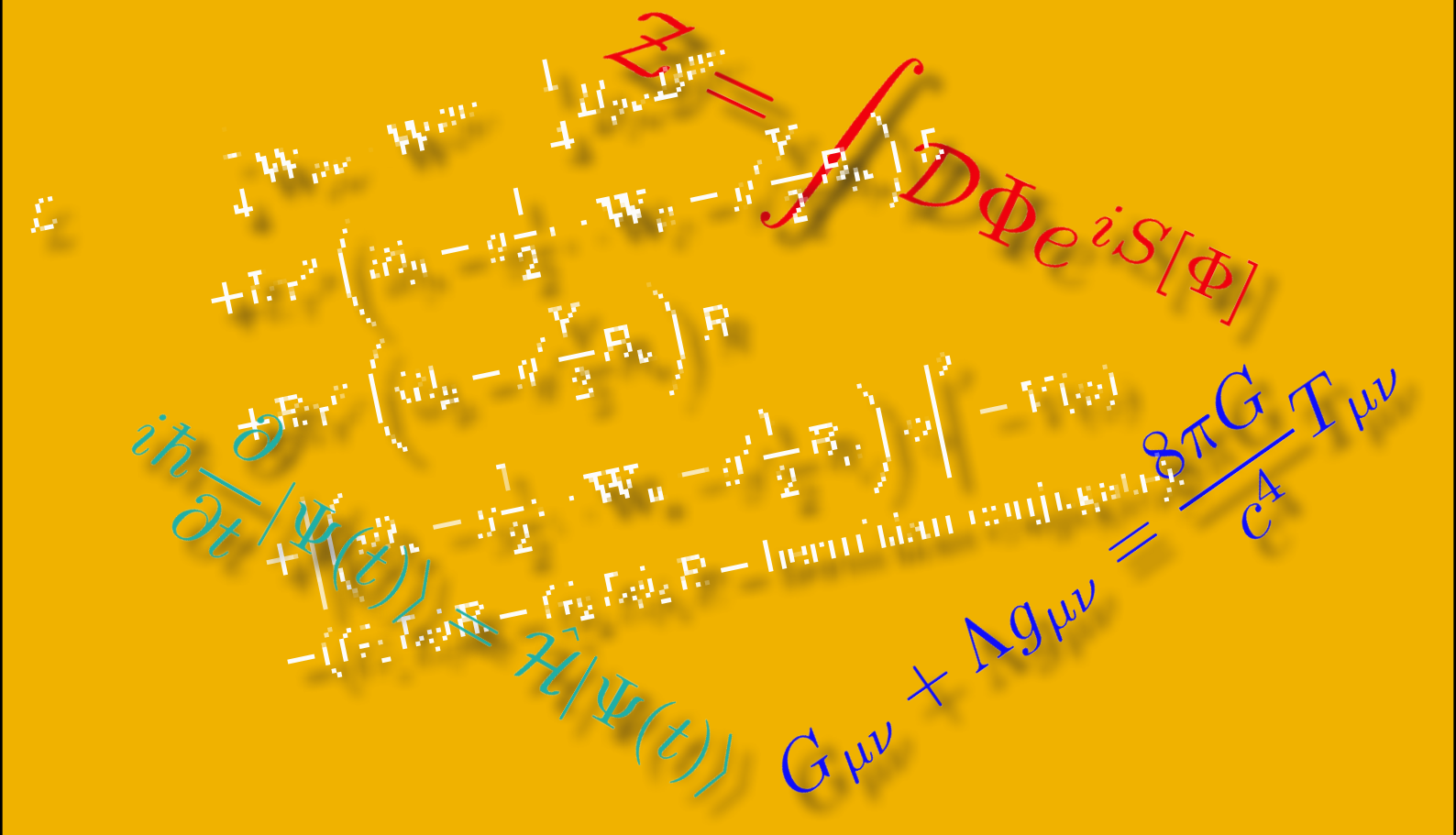
Details on the HPC resources and management can be found in the Webpage:
http://www.ift.uam-csic.es/hydra/

Parte IV

Part IV

Memoria de actividades

Report of Activities



8 Resumen
Summary

Aquí proporcionamos una visión general y completamos la información que figura en detalle en las siguiente páginas.

La principal actividad del IFT es la investigación científica de excelencia a nivel internacional. Esto se refleja en casi 200 artículos científicos al año en 2019-20, la mayoría publicados en revistas internacionales del más alto nivel

Los miembros del IFT participan en comités y paneles científicos prestigiosos a niverl internacional. Belén Gavela pertenece al Comité de Política Científica del CERN, Luis Ibáñez es miembro del Comité Europeo para Aceleradores Futuros (European Committee for Future Accelerators, ECFA), y el Panel de Altas Energías de la Sociedad Europea de Física. Por último, 4 miembros del IFT son editores de la prestigiosa revista JHEP, un hito no igualado por ninguna otra institución en el campo. El IFT ha renovado y establecido nuevos programas de intercambio de visitantes con centros extranjeros en 2019-20.

A pesar de la pandemia por la COVID19 en 2020, el IFT ha mantenido un excelente nivel de actividad. Durante 2019-20, el IFT ha organizado 19 congresos y un programa extendido, con un total de varios cientos de participantes internacionales. Estas actividades han consolidado el carácter del IFT como un centro internacional para el intercambio científico. Además el IFT ha albergado más de 100 seminarios especializados, 7 coloquios con ponente de altísimo nivel, y múltiples discusiones científicas en formato de journal club.

El IFT participa en el programa de Posgrado en Física Teórica del Departamento de Física Teórica de la UAM con docencia en los cursos de Máster, y la organización de una docena de cursos de doctorado en 2019-20 Esto garantiza un flujo constante de estudiantes de doctorado en IFT. En 2019-20 se han completado 25 tesis doctorales y varias decenas de tesis de fin de máster.

La transferencia de conocimiento al público general se logra a través de un intenso programa de divulgación. En 2019-20 hay decenas de colaboraciones con los medios de comunicación, y más de 50 charlas y otras actividades en centros de enseñanza secundaria. Se realizaron 6 coloquios para el público en general en diversos ámbitos. Asimismo se ha continuado la elaboración de vídeos de animación divulgativos sobre los temas de investigación del IFT, con un gran éxito en su difusión en el canal Youtube del IFT, que ha superado las 500.000 suscripciones y los 30.000.000 visualizaciones, y del pionero evento Cultube con creadores culturales líderes en Youtube.

Here we give an overview and complete the information displayed in the following pages.

The main activity of the IFT is scientific research at the highest excellence level. This is reflected in the approximately 200 scientific publications per year in 2019-20, published in the leading international journals in theoretical physics.

IFT members participate in the most reputed international committees. Belén Gavela belongs to the CERN Scientific Policy Committee, Luis Ibáñez is member of ECFA (European Committee for Future Accelerators) and the High Energies Panel of the European Physics Society. Finally, four members of IFT are editor of the prestigious journal JHEP, an unequaled feat in institutions world-wide. The IFT has renewed and established new international visitor exchange programs in 2019-20.

Despite the COVID19 pandemic in 2020, the IFT han maintained a very high level of activity. During 2019-20, the IFT has hosted 19 workshops and one extended program, bringing in hundreds of international visitor and participants. These activities situate IFT as an international reference for scientific exchange. In addition, the IFT has organized over 100 specialized seminars, 7 high profile colloquia and many scientific discussions in the journal club format.

The IFT participates in the Posgraduate Program of the UAM Theoretical Physics Department, with teaching in the Master Program courses, and the organization of about a dozen PhD courses in 2018. This guarantees a constant influx of PhD students at the IFT. A total of 25 PhD thesis and several dozens of Master thesis were successfully completed at the IFT in 2018.

Transferring knowledge to the general public is achieved via the outreach program. In 2019-20 there where multiple collaborations with mass media, and over 50 outreach talks and activities in the High School sector. We organized 6 colloquia for the general public. The IFT also continued the elaboration of a series of outreach animation videos, with enormous success in its Youtube channel, which surpassed 500,000 subscribers and 30 million views, and with the pionnering event Cultube, with top Youtube creators in Spain.

Plan estratégico 2018-2021

El Instituto de Física Teórica elaboró, como los demás Institutos del CSIC, el Plan Estratégico para el periodo cuatrianual 2018-2021 El Plan incluye un balance de los recursos y resultados obtenidos previamente y una serie de objetivos a alcanzar para el periodo en cuestión. En dicho plan el Instituto se estructuró en base a las siguientes lineas de investigación:

Action Plan 2018-2021

As other CSIC institutes, the IFT presented its Action Plan for the four-year period 2018-2021.
The Plan included a balance of previous activities and resources and a list of goals for the period in question. In that document the research activities of the Institute were structured into the following research lines:

LÍNEAS DE INVESTIGACIÓN DEL IFT / IFT RESEARCH LINES	
1	Origin and Composition of the Universe
2	Origin of Mass
3	Quantum Field, Gravity and Strings
4	Theoretical Condensed Matter and Quantum Information

ACUERDOS INTERNACIONALES / INTERNATIONAL AGREEMENTS

El IFT mantiene programas de colaboración para intercambio de visitantes con varias instituciones. Los programas de colaboración del IFT son:

The IFT maintains International Agreements for visitor exchanges with different institutions. The Collaboration Agreements of the IFT are:

Fermilab

Kavli Institute for Theoretical Physics, China

Abdus Salam International Centre for Theoretical Physics, Trieste

Scuola Internazionale Superiore di Studi Avanzati

International Centre for Theoretical Physics, South American Institute for Fundamental Research, Sao Paulo

Center for Theoretical Physics of the Universe, Institute for Basic Science, South Korea

Memoria Anual
Annual Report

2019-2020

9

Recursos Económicos
Economic Resources

Como organización sin ánimo de lucro y dedicada a la investigación básica, la financiación del IFT proviene enteramente de organismos públicos nacionales y extranjeros. Distinguiremos en lo que sigue la parte del presupuesto obtenida de forma directa de las instituciones madre (UAM y CSIC) de la que resultante de captación de recursos en procesos competitivos.

As a non-profit organization dedicated to fundamental research, the funding of IFT comes entirely from national or international public institutions. We will distinguish in what follows the part of the IFT budget which is assigned directly by our host institutions (UAM and CSIC) from that resulting from external resources obtained through a competitive process.

Financiación directa

Parte de financiación del Instituto está incluida en el anexo anual al convenio de creación que fija el presupuesto del IFT y que aportan los dos organismos madre (CSIC y UAM) Esta financiación se ha mantenido estable en el rango de los 400.000 euros en los últimos años, sin incluir los salarios del personal del IFT.

Direct budget

Part of the funding of IFT is included in the annual annex to the Constitution Agreement that fixes its yearly budget, and which is directly transferred by its host Institutions (UAM and CSIC). This direct budget has remained stable in the range of 400,000 euros in the last few years, not including salaries for IFT members.

Financiación Competitiva

En la tabla siguiente se muestran los principales proyectos que financian la investigación del IFT, obtenidos de distintos organismos por medio de concursos competitivos, y activos durante 2019-20 .

Competitive Funding

The tables show the main grants and programs which finance the research activities at the IFT, active in 2019-20. These grants are awarded after a competitive process involving external panel reviews.

Grant	Ref.	Agency	P.I.	Total	Dates
Acreditación Centro de Excelencia Severo Ochoa	SEV-2016-0597	Ministry	Luis Ibáñez	4.000.000,00 €	2017-2021
String Phenomenology in the LHC era	ERC-2012-ADG-20120216	EU	Luis Ibáñez	1.496.000,00 €	2013-2019
UV completion through Bose-Einstein condensation: A quantum model of black holes	ERC-2013-ADG-010168	EU	César Gómez	304.825,20 €	2014-2019
Europlex	PITN-GA-2018-813942	EU	Gregorio Herdoíza (IFT node)	501.809,76 €	2018-2022
The Elusives Enterprise: Asymmetries of the Invisible Universe	MSCA-ITN-2015//674896-ELUSIVES	EU	Belén Gavela (Global Coord.)	495,745,92 €	2016-2020
Invisibles Plus	ITN-2015, 2016-20	EU	Belén Gavela (Global Coord.)	207.000,00 €	2016-2020
HIDDeN	H2020-MSCA-ITN-2019//860881-HIDDeN	EU	Belén Gavela (IFT node)	418.174,80 €	2020-2024
HIDDeN-PLUS	MSCA-RISE-2019-/101007983		Belén Gavela (IFT node)	391.000,00 €	2020-2024
Feasability study for employing the uniquely powerful ESS linear accelerator to generate an intense neutrino beam for leptonic CP violation discovery and measurement	H2020-INFRADEV-2017-1-777419	EU	Enrique Fernández (IFT node)	140.000,00 €	2018-2022
STRONGNET	H2020-INFRAIA-2018-1/824093	EU	Gregorio Herdoíza (IFT node)	38.750,00 €	2019-2023
Combining forces for a nobel European facility for neutrino-antineutrino symmetry-violation discovery	COST Action CA15139	EU	Enrique Fernández	Total 1.863.465,42 €	2016-2020
EU Cofund La Caixa Junior Leader Incoming	GA-847648		Daniele Gaggero,	280.500,00 €	2018-2021

Grant	Ref.	Agency	P.I.	Total	Dates
EU Cofund La Caixa Junior Leader Incoming	GA-847648	EU-La Caixa	Matteo Martinelli	297.900 €	2019-2022
EU Cofund La Caixa Junior Leader Incoming	GA-847648	EU-La Caixa	Pierre Fleury	297.900 €	2019-2022
EU Cofund Intertalentum UAM	GA-713366	EU-UAM	Mauro Pieroni	110.532,48 €	2017-2019
EU Cofund Intertalentum UAM	GA-713366	EU-UAM	Thomas Lacroiz	133.800 €	2019-2021
EU Cofund Intertalentum UAM	GA-713366	EU-UAM	Santiago Ávila	102.600 €	2019-2021
Supergravity Tools for Holography	US NSF-1720364 Award	US NSF	Óscar Varela	165.000 $	2017-2020
Gravitation and Black Hole Electrodynamics	US NSF-1707571 Award	US NSF	María J. Rodríguez	135.270 $	2017-2020
Stochastic gravitational wave background search with KAGRA	Grant in Aid 20H01899	Japan Ministry of Science	Sachiko Kuroyanagi,	17.550.000 JPY	2020-2023
Developing data analysis methods for gravitational waves from cosmic strings	Grant in Aid 17K14282	Japan Ministry of Science	Sachiko Kuroyanagi	4.160.000 JPY	2017-2019
Gravedad, Supergravedad y Supercuerdas	FPA2015-66793-P	Ministry	Tomás Ortín	35.574,00 €	2015-2019
Nuevas avenidas en Física de Partículas	FPA2016-78645P	Ministry	María José Herrero Enrique Fernández	302.500,00 €	2016-2019
Fenomenología más allá del Modelo Estándar e implicaciones fenomenológicas en la era del LHC	FPA2016-78022-P	Ministry	Alberto Casas	169.400,00 €	2016-2020
Teoria de cuerdas y la frontera de la gravedad cuántica	PGC2018-095976-B-C21	Ministry	F. Marchesano, A. Uranga	366.630,00 €	2019-2021
Teoría cuántica de campos no perturbativa en la frontera de intensidad	PGC2018-094857-B-I00	Ministry	Carlos Pena Gregorio Herdoíza	169.400 €	2019-2021
Partículas, Astropartículas y Materia Oscura en el Universo	PGC2018-095161-B-I00	Ministry	Carlos Muñoz Miguel A. Sánchez Conde	96.800 €	2019-2021
Gravedad, Supergravedad y Supercuerdas	PGC2018-095205-B-I00	Ministry	Tomás Ortín	72.600 €	2019-2021

Grant	Ref.	Agency	P.I.	Total	Dates
Tecnologías Cuánticas Teóricas	PGC2018-095862-B-C21	Ministry	Germán Sierra, Esperanza López	42.955 €	2019-2021
Física fundamental y cosmología con cartografiados extragalácticos	PGC2018-094773-B-C32	Ministry	Juan García-Bellido Savvas Nesseris	133.100 €	2019-2021
Física más allá del Modelo Estándar y sus implicaciones para el Universo primitivo: Nuevas ideas y técnicas	PGC2018-096646-A-I00	Ministry	José Miguel No Guillermo Ballesteros	30.250 €	2019-2021
Fenomenología más allá del modelo estándar e implicaciones cosmológicas	PID2019-110058GB-C22	Ministry	Jesús Moreno Agustín Sabio Vera	111.320 €	2020-2023
El modelo estándar y sus extensiones en el LHC y otros experimentos actuales y futuros	PID2019-110058GB-C21	Ministry	Sven Heinemeyer Michele Maltoni	96.800 €	2020-2023
Red Consolider Multidark	FPA2017-90566-REDC	Ministry	Carlos Muñoz (Coordinator)	30.000,00 €	2018-2020
SOMMA: Alliance of Severo Ochoa Excellence Centers and María de Maeztu Units	BFU2016-81721-REDE	Ministry	Luis Ibáñez (IFT node)	Total 120.000,00 €	2017-2019
Tecnologia de información cuántica Madrid	S2018/TCS-4342	CSIC	Germán Sierra	55.372,50 €	2019-2022
Atracción de talento investigador	2016-T1-TIC-1542	C. Madrid	Miguel Ángel Sánchez Conde	194.100,00 €	2017-2021
Atracción de talento investigador	2017-T1/TIC-5520	C. Madrid	Guillermo Ballesteros	162.000,00 €	2018-2022
Atracción de talento investigador	2017-T1/TIC-5202	C. Madrid	Jose Miguel No	158.925,00 €	2018-2022
Atracción de talento investigador	2017-T1/TIC-5258	C. Madrid	Daniel Areán	159.000,00 €	2018-2022
Atracción de talento investigador	2019-T1/TIC-14019	C. Madrid	Ernesto Arganda	303.000,00 €	2020-2024
Atracción de talento investigador	2019-T1/TIC-15568	C. Madrid	Paolo Benincasa	289.000,00 €	2020-2024
Atracción de talento investigador	2019-T1/TIC-15784	C. Madrid	Matteo Fasiello	289.000,00 €	2020-2024
Atracción de talento investigador	2019-T1/TIC-13177	C. Madrid	Sachiko Kuroyanagi	268.800,00 €	2020-2024
Ayudas atracción del talento investigador jóvenes Doctores	2017-T2/TIC-5455	C. Madrid	Bryan Zaldívar	80.000,00 €	2018-2022
Beatriz Galindo Fellowship: Probing the invisible side of the universe	SI2/PBG/2020-00005	Ministry	David G. Cerdeño	216.000,00 €	2020-2024

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En esta seccion recogemos los artículos publicados por miembros de nuestro Instituto durante los años 2019 y 2020.

In this section we list the papers published by members of our Institute in 2019 and 2020.

Artículos / Papers 2019

1. Out-of-equilibrium chiral magnetic effect and momentum relaxation in holography, Fernández-Pendás, J., Landsteiner, K. Physical Review D 100 (2019) 12, art. no. 126024.
2. Primordial black holes and the origin of the matter-antimatter asymmetry, García-Bellido, J. Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 377 (2019) 2161, art. no. 20190091.
3. Vibrational density of states and specific heat in glasses from random matrix theory, Baggioli, M., Milkus, R., Zaccone, A. Physical Review E 100 (2019) 6, art. no. 062131.
4. Primordial black holes as silver bullets for new physics at the weak scale, Bertone, G., Coogan, A.M., Gaggero, D., Kavanagh, B.J., Weniger, C. Physical Review D 100 (2019) 12, art. no. 123013.
5. Electron and photon performance measurements with the ATLAS detector using the 2015-2017 LHC proton-proton collision data, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of Instrumentation 14 (2019) 12, art. no. P12006.
6. Theory of the phonon spectrum in host-guest crystalline solids with avoided crossing, Baggioli, M., Cui, B., Zaccone, A. Physical Review B,100 (2019) 22, art. no. 220201.
7. Model-Independent Determination of H0 and wk0 from Strong Lensing and Type Ia Supernovae, Collett, T., Montanari, F., Räsänen, S. Physical Review Letters 123 (2019) 23, art. no. 231101.
8. Anti-brane singularities as red herrings, Blabäck, J., Gautason, F.F., Ruipérez, A., Van Riet, T. Journal of High Energy Physics 12 (2019) 125.
9. Searching for correlations in Gaia DR2 unbound star trajectories, Montanari, F., Barrado, D., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 490 (2019) 4, pp. 5647-5657.
10. Properties of subhalos in the interacting dark matter scenario, Moliné, A., Schewtschenko, J.A., Sánchez-Conde, M.A., Aguirre-Santaella, A., Cora, S.A., Abadi, M.G. Galaxies 7 (2019) 4, art. no. 80.
11. Reprint of "Evidence for color dichotomy in the primordial Neptunian Trojan population", including García-Bellido, J., Icarus 334 (2019) 79-88.
12. Search for RR Lyrae stars in DES ultrafaint systems: GrUS I, Kim 2, Phoenix II, and Grus II, DES Collaboration including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 490 (2019) 2, pp. 2183-2199.
13. Dark energy survey year 1 results: The relationship between mass and light around cosmic voids, DES Collaboration including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 490 (2019) 3, pp. 3573-3587.
14. Mass variance from archival X-ray properties of Dark Energy Survey Year-1 galaxy clusters, DES Collaboration including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 490 (2019) 3, pp. 3341-3354.
15. Search for bottom-squark pair production with the ATLAS detector in final states containing Higgs bosons, b-jets and missing transverse momentum, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 12 (2019) 60.
16. Linear viscoelastic dynamics in holography, Andrade, T., Baggioli, M., Pujolas, O. Physical Review D 100 (2019) 10, art. no. 106014.
17. H0Licow - X. Spectroscopic/imaging survey and galaxy-group identification around the strong gravitational lens system WFI 2033-4723, Sluse, D., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 490 (2019) 1, pp. 613-633.
18. QCD, from its inception to its stubbornly unsolved problems, De Rújula, A. International Journal of Modern Physics A 34 (2019) 32, art. no. 1930015.
19. Orbits in nonsupersymmetric magic theories, Marrani, A., Romano, L. International Journal of Modern Physics A 34 (2019) 32, art. no. 1950190.
20. Universal Relaxation in a Holographic Metallic Density Wave Phase, Amoretti, A., Areán, D., Goutéraux, B., Musso, D. Physical Review Letters 123 (2019) 21, art. no. 211602.

Artículos / Papers 2019

21. Dark matter from dark photons: A taxonomy of dark matter production, Hambye, T., Tytgat, M.H.G., Vandecasteele, J., Vanderheyden, L. Physical Review D 100 (2019) 9, art. no. 095018.
22. Baryogenesis in the paradigm of quintessential inflation, Ahmad, S., De Felice, A., Jaman, N., Kuroyanagi, S., Sami, M. Physical Review D 100 (2019) 10, art. no. 103525.
23. Reconstructing the spectral shape of a stochastic gravitational wave background with LISA, Caprini, C., Figueroa, D.G., Flauger, R., Nardini, G., Peloso, M., Pieroni, M., Ricciardone, A., Tasinato, G. Journal of Cosmology and Astroparticle Physics 11 (2019) 017.
24. Brown dwarf census with the Dark Energy Survey year 3 data and the thin disc scale height of early L types, Rosell, A.C., et al including. García-Bellido, J., Avila, S. Monthly Notices of the Royal Astronomical Society 489 (2019) 4, pp. 5301-5325.
25. Dark Energy Survey Year 1 results: Constraints on intrinsic alignments and their colour dependence from galaxy clustering and weak lensing, Samuroff, S., et al including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 489 (2019) 4, pp. 5453-5482.
26. Self-interacting chiral p-forms in higher dimensions, Buratti, G., Lechner, K., Melotti, L. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 798 (2019) 135018.
27. Gravitational-wave luminosity distance in quantum gravity, Calcagni, G., Kuroyanagi, S., Marsat, S., Sakellariadou, M., Tamanini, N., Tasinato, G. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 798 (2019) 135000.
28. Unitarization effects in EFT predictions of WZ scattering at the LHC, Garcia-Garcia, C., Herrero, M., Morales, R.A. Physical Review D 100 (2019) 9, art. no. 096003.
29. Tensor renormalization group in bosonic field theory, Campos, M., Sierra, G., López, E. Physical Review B 100 (2019) 19, art. no. 195106.
30. Tunneling without bounce, Espinosa, J.R. Physical Review D 100 (2019) 10, art. no. 105002.
31. Fresh look at the calculation of tunneling actions including gravitational effects, Espinosa, J.R. Physical Review D 100 (2019) 10, art. no. 104007.
32. P-brane Newton-Cartan geometry, Pereñíguez, D. Journal of Mathematical Physics 60 (2019) 11, art. no. 112501.
33. Minimal D 4 truncations of type I IA, Varela, O. Journal of High Energy Physics 11 (2019) 9.
34. Superconformal blocks for mixed 1/2-BPS correlators with SU(2) R-symmetry, Baume, F., Fuchs, M., Lawrie, C. Journal of High Energy Physics 11 (2019) 164.
35. Non-Abelian rotating black holes in 4- and 5-dimensional gauged supergravity, Ortín, T., Ruipérez, A. Journal of High Energy Physics 11 (2019) 167.
36. All higher-curvature gravities as Generalized quasi-topological gravities, Bueno, P., Cano, P.A., Moreno, J., Murcia, A. Journal of High Energy Physics 11(2019)62.
37. Dynamical vector resonances from the EChL in VBS at the LHC: the WW case, Delgado, R.L., Garcia-Garcia, C., Herrero, M.J. Journal of High Energy Physics 11 (2019) 65.
38. Halving ISO(7) supergravity, Guarino, A., Tarrío, J., Varela, O. Journal of High Enery Physics 11(2019) 143.
39. Sampling the mu nu SSM for displaced decays of the tau left sneutrino LSP at the LHC, Kpatcha, E., Lara, I., López-Fogliani, D.E., Muñoz, C., Nagata, N., Otono, H., de Austri, R.R. European Physical Journal C 79 (2019) 11, art. no. 934.
40. The origin of Galactic cosmic rays: Challenges to the standard paradigm, Gabici, S., Evoli, C., Gaggero, D., Lipari, P., Mertsch, P., Orlando, E., Strong, A., Vittino, A. International Journal of Modern Physics D 28 (2019) 15, art. no. 1930022.
41. Global analysis of dark matter simplified models with leptophobic spin-one mediators using MasterCode, Bagnaschi, E., et al including Heinemeyer, S. European Physical Journal C 79 (2019) 11, art. no. 895.
42. Top-quark physics at the CLIC electron-positron linear collider Abramowicz, H., et al including Mateu, V. Journal of High Energy Physics 11 (2019) 3.
43. Measurement of the top-quark mass in ttbar + 1-jet events collected with the ATLAS detector in pp collisions at sqrt(s) = 8 TeV, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 11 (2019) 150.

Artículos / Papers 2019

44. ATLAS b-jet identification performance and efficiency measurement with ttbar events in pp collisions at sqrt(s)=13 TeV, The ATLAS collaboration including Aguilar-Saavedra, J.A. European Physical Journal C 79 (2019) 11, art. no. 970.

45. Detection of CMB-Cluster Lensing using Polarization Data from SPTpol, SPTpol and DES Collaboration including Avila, S., J., García-Bellido, Physical Review Letters 123 (2019) 18, art. no. 181301.

46. Embedding the SU(3) sector of SO(8) supergravity in D=11, Larios, G., Ntokos, P., Varela, O. Physical Review D 100 (2019) 8, art. no. 086021.

47. Analytic expressions for the background evolution of massive neutrinos and dark matter particles, Arjona, R., Cardona, W., Nesseris, S. Journal of Cosmology and Astroparticle Physics 10) (2019) 060.

48. Producing a BOSS CMASS sample with DES imaging, Lee, S., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 489 (2019) 2, pp. 2887-2906.

49. Dark Energy Survey Year 1 results: Validation of weak lensing cluster member contamination estimates from P(z) decomposition, Varga, T.N., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 489 (2019) 2, 2511-2524.

50. Phenotypic redshifts with self-organizing maps: A novel method to characterize redshift distributions of source galaxies for weak lensing, DES Collaboration with Avila, S, García-Bellido, J. Monthly Notices of the Royal Astronomical Society 489(2019)1, 820-841

51. Variational approximations to exact solutions in shell-model valence spaces: Calcium isotopes in the pf shell, Bally, B., Sánchez-Fernández, A., Rodríguez, T.R. Physical Review C 100 (2019) 4, art. no. 044308.

52. Quantum gravity and gravitational-wave astronomy, Calcagni, G., Kuroyanagi, S., Marsat, S., Sakellariadou, M., Tamanini, N., Tasinato, G. Journal of Cosmology and Astroparticle Physics 10 (2019) 012.

53. The minimal stealth boson: models and benchmarks, Aguilar-Saavedra, J.A., Joaquim, F.R. Journal of High Energy Physics 10 (2019) 237.

54. Zoology of solid & fluid holography -- Goldstone modes and phase relaxation, Baggioli, M., Grieninger, S. Journal of High Energy Physics 10 (2019) 235.

55. How many fluxes fit in an EFT? Lanza, S., Marchesano, F., Martucci, L., Sorokin, D. Journal of High Energy Physics 10 (2019) 110.

56. Longitudinal sound and diffusion in holographic massive gravity, Ammon, M., Baggioli, M., Gray, S., Grieninger, S. Journal of High Energy Physics 10 (2019) 64.

57. Discrete symmetries in dimer diagrams, García-Valdecasas, E., Mininno, A., Uranga, A.M. Journal of High Energy Physics 10 (2019) 91.

58. Minimal D = 4 N = 2 supergravity from D = 11: an M-theory free lunch, Larios, G., Varela, O. Journal of High Energy Physics 10 (2019) 251.

59. Large Nc scaling of meson masses and decay constants, Hernández, P., Pena, C., Romero-López, F. European Physical Journal C 79 (2019) 10, art. no. 865.

60. On the evolution of operator complexity beyond scrambling, Barbón, J.L.F., Rabinovici, E., Shir, R., Sinha, R. Journal of High Energy Physics 10(2019)264.

61. The axion and the Goldstone Higgs, Brivio, I., Gavela, M.B., Pascoli, S., del Rey, R., Saa, S. Chinese Journal of Physics 61 (2019) pp. 55-71.

62. Cosmic inflation without inflaton, Arciniega, G., Bueno, P., Cano, P.A., Edelstein, J.D., Hennigar, R.A., Jaime, L.G. International Journal of Modern Physics D 28 (2019) 14, art. no. 1944008.

63. Diffusion and universal relaxation of holographic phonons, Amoretti, A., Areán, D., Goutéraux, B., Musso, D. Journal of High Energy Physics 10(2019)68.

64. A DECam Search for Explosive Optical Transients Associated with IceCube Neutrino Alerts, Morgan, R., et al including Avila, S., J., García-Bellido, J. Astrophysical Journal 883 (2019) 2, art. no. 125.

65. Methods for cluster cosmology and application to the SDSS in preparation for DES Year 1 release, DES Collaboration including Avila, S., J., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 488 (2019) 4, pp. 4779-4800.

66. Long-lived particles at the energy frontier: The MATHUSLA physics case Curtin, D., et al including No, J. M. Reports on Progress in Physics 82 (2019) 11, art. no. 116201.

Artículos / Papers 2019

67. Search for heavy neutral leptons in decays of W bosons produced in 13 TeV pp collisions using prompt and displaced signatures with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 10 (2019) 265,

68. Measurement of the inclusive isolated-photon cross section in pp collisions at sqrt(s) = 13 TeV using 36 fb^-1 of ATLAS data, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 10 (2019) 203.

69. Measurement of ZZ production in the l l nu nu final state with the ATLAS detector in pp collisions at sqrt(s) = 13 TeV, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 10 (2019) 127.

70. Measurement of the inclusive cross-section for the production of jets in association with a Z boson in proton-"proton collisions at 8 TeV using the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. European Physical Journal C 79 (2019) 10, art. no. 847.

71. Integrable Floquet Hamiltonian for a Periodically Tilted 1D Gas, Colcelli, A., Mussardo, G., Sierra, G., Trombettoni, A. Physical Review Letters 123 (2019) 13, art. no. 130401.

72. Dark Energy Survey Year 1 results: The effect of intracluster light on photometric redshifts for weak gravitational lensing Gruen, D., et al including Avila, S., J., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 488 (2019) 3, pp. 4389-4399.

73. Designing Horndeski and the effective fluid approach, Arjona, R., Cardona, W., Nesseris, S. Physical Review D 100 (2019) 6, art. no. 63526.

74. A Hamilton-Jacobi formulation of anisotropic inflation, Cicciarella, F., Mabillard, J., Pieroni, M., Ricciardone, A. Journal of Cosmology and Astroparticle Physics 9 (2019) 044.

75. Machine-learning Classifiers for Intermediate Redshift Emission-line Galaxies, Zhang, K., Schlegel, D.J., Andrews, B.H., Comparat, J., Schafer, C., Vazquez Mata, J.A., Kneib, J.-P., Yan, R. Astrophysical Journal 883 (2019) 1, art. no. 63.

76. Constraints on the redshift evolution of astrophysical feedback with Sunyaev-Zel'dovich effect cross-correlations, DES Collaboration including Avila, S., García-Bellido, J. Physical Review D 100 (2019) 6, art. no. 63519.

77. Resolution of the ATLAS muon spectrometer monitored drift tubes in LHC Run 2, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of Instrumentation 14 (2019) 9, art. no. P09011.

78. Normal and intruder configurations in Si 34 populated in the beta- Decay of Mg 34 and Al 34 Lica, R., et al including Poves, A. Physical Review C 100 (2019) 3, art. no. 034306.

79. Chemical Abundance Analysis of Tucana III, the Second r-process Enhanced Ultra-faint Dwarf Galaxy This paper includes data gathered with the 6.5 m Magellan Telescopes located at Las Campanas Observatory, Chile, Marshall, J.L., et al including García-Bellido, J. Astrophysical Journal 882 (2019) 2, art. no. 177.

80. Symmetry protected phases in inhomogeneous spin chains, De Buruaga, N.S.S., Santalla, S.N., Rodríguez-Laguna, J., Sierra, G. Journal of Statistical Mechanics: Theory and Experiment 9 (2019) 093102.

81. Branes and polytopes, Romano, L. Journal of Physics A: Mathematical and Theoretical 52 (2019) 39, art. no. 395401.

82. Information-theoretic meaning of quantum information flow and its applications to amplitude amplification algorithms, Singha Roy, S., Bae, J. Physical Review A 100 (2019) 3, art. no. 032303.

83. Very light asymmetric dark matter, Alonso-Álvarez, G., Gehrlein, J., Jaeckel, J., Schenk, S. Journal of Cosmology and Astroparticle Physics 9 (2019) 003.

84. Reggeon Webs, Spin Chains and the Odderon, Grigorios Chachamis, AgustÃn Sabio Vera, Physics of Particles and Nuclei Letters 16 (2019) 5, pp. 421-426.

85. A unified description of translational symmetry breaking in holography, Ammon, M., Baggioli, M., Alba, A.J. Journal of High Energy Physics 9 (2019) 124.

86. Holographic bulk reconstruction and cosmological singularities, Barbón, J.L.F., Sasieta, M. Journal of High Energy Physics 9 (2019) 26.

87. Duality invariant self-interactions of abelian p-forms in arbitrary dimensions, Buratti, G., Lechner, K., Melotti, L. Journal of High Energy Physics 9 (2019) 22.

88. Holographic plasmon relaxation with and without broken translations, Baggioli, M., Gran, U., Alba, A.J., Tornsö, M., Zingg, T. Journal of High Energy Physics 9 (2019) 13.

Artículos / Papers 2019

89. On missing Bianchi identities in cohomology formulation, Gao, X., Shukla, P., Sun, R. European Physical Journal C 79 (2019) 9, art. no. 781.

90. Model-independent search strategy for the lepton-flavor-violating heavy Higgs boson decay to at the LHC, Arganda, E., Marcano, X., Mileo, N.I., Morales, R.A., Szynkman, A. European Physical Journal C 79 (2019) 9, art. no. 738.

91. A new RASS galaxy cluster catalogue with low contamination extending to z \sim 1 in the DES overlap region, DES Collaboration including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 1 (2019) pp. 739-769.

92. Galaxies in X-ray selected clusters and groups in dark energy survey data -- II. Hierarchical Bayesian modelling of the red-sequence galaxy luminosity function, Zhang, Y., et al including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 1 (2019) pp. 1-17.

93. Monte Carlo studies for the optimisation of the Cherenkov Telescope Array layout, Acharyya, A., et al including Gaggero, D., Pérez-Romero, J. Astroparticle Physics 111 (2019) pp. 35-53.

94. Search for diboson resonances in hadronic final states in 139 fb^-1 of pp collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 9 (2019) 91.

95. Searches for scalar leptoquarks and differential cross-section measurements in dilepton-dijet events in proton-proton collisions at a centre-of-mass energy of sqrt(s) = 13Â TeV with the ATLAS experiment, The ATLAS collaboration including Aguilar-Saavedra, J.A. European Physical Journal C 79 (2019) 9, art. . 733.

96. First order perturbations of hypersurfaces of arbitrary causal character, Nolan, B.C., Reina, B., Sousa, K. Classical and Quantum Gravity 36 (2019) 18, art. no. 185016.

97. RG-2 flow, mass and entropy, Andino, O.L. Classical and Quantum Gravity 36 (2019) 6, art. no. 065011.

98. The Morphology and Structure of Stellar Populations in the Fornax Dwarf Spheroidal Galaxy from Dark Energy Survey Data, Wang, M.Y., et al including Avila, S., García-Bellido, J. Astrophysical Journal 881 (2019) 2, art. no. 118.

99. Generalized near horizon extreme binary black hole geometry, Ciafre, J., Hadar, S., Rickenbach, E., Rodriguez, M.J. Physical Review D 100 (2019) 4, art. no. 044033.

100. Dark Energy Survey Year 1 Results: Cross-correlation between Dark Energy Survey Y1 galaxy weak lensing and South Pole Telescope +Planck CMB weak lensing, DES and SPT Collaborations, including Avila, S., García-Bellido, J. Physical Review D 100 (2019) 4, art. no. 043517.

101. C IV black hole mass measurements with the Australian Dark Energy Survey (OzDES), Hoormann, J.K., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society, 487 (2019) 3, pp. 3650-3663.

102. Dark Energy Survey Year 1 results: Measurement of the galaxy angular power spectrum, Camacho, H., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 487 (2019) 3, pp. 3870-3883.

103. Instantons and infinite distances, Marchesano, F., Wiesner, M. Journal of High Energy Physics 8(2019)88.

104. A Strong Scalar Weak Gravity Conjecture and some implications, Gonzalo, E., Ibáñez, L.E. Journal of High Energy Physics 8 (2019) 118.

105. Lie algebra expansions and actions for non-relativistic gravity, Bergshoeff, E., Izquierdo, J.M., Ortín, T., Romano, L. Journal of High Energy Physics 8 (2019) 48.

106. Precise prediction for the Higgs-Boson masses in the mu nu SSM with three right-handed neutrino superfields, Biekötter, T., Heinemeyer, S., Muñoz, C. European Physical Journal C 79(2019)8, art. n. 667.

107. Probing the Higgs self-coupling through double Higgs production in vector boson scattering at the LHC, Arganda, E., Garcia-Garcia, C., Herrero, M.J. Nuclear Physics B 945 (2019) 114687.

108. The Swampland Distance Conjecture and towers of tensionless branes, Font, A., Herráez, A., Ibáñez, L.E. Journal of High Energy Physics 8 (2019) 44.

109. A numerical routine for the crossed vertex diagram with a massive-particle loop, Bonciani, R., Degrassi, G., Giardino, P.P., Gröber, R. Computer Physics Communications 241 (2019) pp. 122-131.

Artículos / Papers 2019

110. Three new VHS-DES quasars at 6.7 < z < 6.9 and emission line properties at z > 6.5, Reed, S.L., et al including Avila, S., García-Bellido, J., Monthly Notices of the Royal Astronomical Society 487 (2019) 2, pp. 1874-1885.

111. Measurement of the splashback feature around SZ-selected Galaxy clusters with DES, SPT, and ACT, Shin, T., et al including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 487 (2019) 2, pp. 2900-2918.

112. Dark Energy Survey Year 1 Results: Tomographic cross-correlations between Dark Energy Survey galaxies and CMB lensing from South Pole Telescope+Planck, DES and SPT Collaborations including Avila, S., García-Bellido, J. Physical Review D 100 (2019) 4, art. no. 043501, .

113. Measurement of jet-substructure observables in top quark, W boson and light jet production in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 8 (2019) 33.

114. Looking for ultralight dark matter near supermassive black holes, Bar, N., Blum, K., Lacroix, T., Panci, P. Journal of Cosmology and Astroparticle Physics 7 (2019) 045.

115. Several Problems in Particle Physics and Cosmology Solved in One SMASH, Ballesteros, G., Redondo, J., Ringwald, A., Tamarit, C. Frontiers in Astronomy and Space Sciences 6 (2019) 55.

116. Cosmological lensing ratios with des Y1, SPT, and Planck, Prat, J., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 487 (2019) 1, pp. 1363-1379.

117. Testing modified gravity at cosmological distances with LISA standard sirens, Belgacem, E., et al including Ezquiaga, J.M., Fasiello, M., García-Bellido, Journal of Cosmology and Astroparticle Physics 7 (2019) 024.

118. Unidentified gamma-ray sources as targets for indirect dark matter detection with the Fermi-Large Area Telescope, Coronado-BlÃ¡zquez, J., Sánchez-Conde, M.A., DomÃnguez, A., Aguirre-Santaella, A., Mauro, M.D., Mirabal, N., Nieto, D., Charles, E. Journal of Cosmology and Astroparticle Physics 7 (2019) 020.

119. Double-logarithms in N = 8 supergravity: impact parameter description & mapping to 1-rooted ribbon graphs, Sabio Vera, A. Journal of High Energy Physics 7 (2019) 80.

120. Dynamical axions and gravitational waves, Croon, D., Houtz, R., Sanz, V. Journal of High Energy Physics 7 (2019) 146.

121. Same-sign WW scattering in the HEFT: discoverability vs. EFT validity, Kozów, P., Merlo, L., Pokorski, S., Szleper, M. Journal of High Energy Physics 7 (2019) 21.

122. Neutrino portals to dark matter, Blennow, M., Fernández-Martínez, E., Olivares-Del Campo, A., Pascoli, S., Rosauro-Alcaraz, S., Titov, A.V. European Physical Journal C 79 (2019) 7, art. no. 555.

123. The effectiveness of relativistic invariance in AdS3, Fontanella, A., Sax, O.O., Stefanski, B., Jr., Torrielli, A. Journal of High Energy Physics 7 (2019) 105.

124. Vector SIMP dark matter with approximate custodial symmetry, Choi, S.-M., Lee, H.M., Mambrini, Y., Pierre, M. Journal of High Energy Physics 7 (2019) 49.

125. MSSM Higgs boson searches at the LHC: benchmark scenarios for Run 2 and beyond, Bagnaschi, E., Bahl, H., Fuchs, E., Hahn, T., Heinemeyer, S., Liebler, S., Patel, S., Slavich, P., Stefaniak, T., Wagner, C.E.M., Weiglein, G. European Physical Journal C 79 (2019) 7, art. no. 617.

126. Search for scalar resonances decaying into mu^+ mu^- in events with and without b-tagged jets produced in proton-proton collisions at sqrt(s)=13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 7 (2019) 117.

127. HE-LHC: The High-Energy Large Hadron Collider: Future Circular Collider Conceptual Design Report Volume 4, the FCC Collaboration including Aguilar-Saavedra, J.A. Heinemeyer, S., No, J.M. European Physical Journal: Special Topics 228 (2019) 5, pp. 1109-1382.

128. FCC-hh: The Hadron Collider: Future Circular Collider Conceptual Design Report Volume 3, the FCC Collaboration including Aguilar-Saavedra, J.A. Heinemeyer, S., No, J.M. European Physical Journal: Special Topics 228 (2019) 4, pp. 755-1107.

Artículos / Papers 2019

129. Reduction of couplings and its application in particle physics, Heinemeyer, S., Mondragón, M., Tracas, N., Zoupanos, G. Physics Reports 814 (2019) pp. 1-43.

130. Black holes, gravitational waves and fundamental physics: A roadmap, Barack, L., et al including Gaggero, D., García-Bellido, J. Classical and Quantum Gravity 36 (2019) 14, art. no. 143001.

131. Effect of long-range interactions on multipartite entanglement in Heisenberg chains, Roy, S.S., Dhar, H.S. Physical Review A 99 (2019) 6, art. no. 062318.

132. Combination of Searches for Invisible Higgs Boson Decays with the ATLAS Experiment, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review Letters 122 (2019) 23, art. no. 231801.

133. Multi-wavelength astronomical searches for primordial black holes, Manshanden, J., Gaggero, D., Bertone, G., Connors, R.M.T., Ricotti, M. Journal of Cosmology and Astroparticle Physics 6 (2019) 26. .

134. A semi-analytical perspective on massive galaxies at z \sim 0.55 Stoppacher, D., Prada, F., Montero-Dorta, A.D., Rodríguez-Torres, S., Knebe, A., Favole, G., Cui, W., Benson, A.J., Behrens, C., Klypin, A.A. Monthly Notices of the Royal Astronomical Society 486 (2019) 1, pp. 1316-1331.

135. Modelling radiation damage to pixel sensors in the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of Instrumentation 14 (2019) 6, art. no. P06012.

136. Gravitational wave energy budget in strongly supercooled phase transitions, Ellis, J., Lewicki, M., No, J.M., Vaskonen, V. Journal of Cosmology and Astroparticle Physics 6 (2019) 24.

137. Black hole formation from a general quadratic action for inflationary primordial fluctuations, Ballesteros, G., Jiménez, J.B., Pieroni, M. Journal of Cosmology and Astroparticle Physics 6 (2019) 16.

138. Dark Energy Survey year 1 results: Constraints on extended cosmological models from galaxy clustering and weak lensing, DES Collaboration including Avila, S., García-Bellido, J. Physical Review D 99 (2019) 12, art. no. 123505.

139. Tensor-network approach to compute genuine multisite entanglement in infinite quantum spin chains, Singha Roy, S., Dhar, H.S., De Sen, A., Sen, U. Physical Review A 99 (2019) 6, art. no. 062305.

140. Type IIA flux vacua and alpha'-corrections, Escobar, D., Marchesano, F., Staessens, W. Journal of High Energy Physics 6 (2019) 129.

141. Geometry of massless scattering in integrable superstring, Fontanella, A., Torrielli, A. Journal of High Energy Physics 6 (2019) 116.

142. Numerical stochastic perturbation theory applied to the twisted Eguchi-Kawai model, González-Arroyo, A., Kanamori, I., Ishikawa, K.-I., Miyahana, K., Okawa, M., Ueno, R. Journal of High Energy Physics 6 (2019) 127.

143. Automatic Peccei-Quinn symmetry, Gavela, M.B., Ibe, M., Quilez, P., Yanagida, T.T. European Physical Journal C 79 (2019) 6, art. no. 542.

144. B anomalies and dark matter: a complex connection, Cerdeño, D.G., Cheek, A., Martín-Ramiro, P., Moreno, J.M. European Physical Journal C 79 (2019) 6, art. no. 517.

145. Revisiting the production of ALPs at B-factories, Merlo, L., Pobbe, F., Rigolin, S., Sumensari, O. Journal of High Energy Physics 6 (2019) 91.

146. Signs of heavy Higgs bosons at CLIC: an e+e- road to the electroweak phase transition, No, J.M., Spannowsky, M. European Physical Journal C 79 (2019) 6, art. no. 467.

147. On the determination of leptonic CP violation and neutrino mass ordering in presence of non-standard interactions: present status, Esteban, I., Gonzalez-Garcia, M.C., Maltoni, M. Journal of High Energy Physics 6 (2019) 55.

148. First cosmological results using Type Ia supernovae from the Dark Energy Survey: Measurement of the Hubble constant, MacAulay, E., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 486 (2019) 2, pp. 2184-2196.

149. Searches for third-generation scalar leptoquarks in sqrt(s) = 13 TeV pp collisions with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 6 (2019) 144.

150. FCC Physics Opportunities: Future Circular Collider Conceptual Design Report Volume 1, the FCC Collaboration including Aguilar-Saavedra, J.A. Heinemeyer, S., No, J.M. European Physical Journal C 79 (2019) 6, art. no. 474.

Artículos / Papers 2019

151. FCC-ee: The Lepton Collider: Future Circular Collider Conceptual Design Report Volume 2, the FCC Collaboration including Aguilar-Saavedra, J.A. Heinemeyer, S., No, J.M. European Physical Journal: Special Topics 228 (2019) 2, pp. 261-623.

152. The structure of all the supersymmetric solutions of ungauged N =(1,0),d = 6 supergravity, Cano, P.A., Ortín, T. Classical and Quantum Gravity 36 (2019) 12, art. no. 125007.

153. Anomalous Hall viscosity at the Weyl-semimetal-insulator transition, Copetti, C., Landsteiner, K. Physical Review B 99 (2019) 19, art. no. 195146.

154. Search for top-quark decays t â†' Hq with 36 fbâ^'1 of pp collision data at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 5 (2019) 123.

155. Maxwell interpolation and close similarities between liquids and holographic models, Baggioli, M., Trachenko, K. Physical Review D 99 (2019) 10, art. no. 106002.

156. Search for heavy particles decaying into a top-quark pair in the fully hadronic final state in pp collisions at s =13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 9, art. no. 092004.

157. First spectroscopy of 61 Ti and the transition to the Island of Inversion at N=40, Wimmer, K., et al including Poves, A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 792 (2019) pp. 16-20.

158. 78 Ni revealed as a doubly magic stronghold against nuclear deformation Taniuchi, R., et al including Poves, A. Nature 569 (2019) 7754, pp. 53-58.

159. Leading higher-derivative corrections to Kerr geometry, Cano, P.A., Ruipérez, A. Journal of High Energy Physics 5 (2019) 189.

160. Transplanckian axion monodromy!? Buratti, G., Calderón, J., Uranga, A.M. Journal of High Energy Physics 5 (2019) 176.

161. Modular symmetries and the swampland conjectures, Gonzalo, E., Ibáñez, L.E., Uranga, A.M. Journal of High Energy Physics 5 (2019) 105.

162. UV physics and the speed of sound during inflation, Pedro, F.G. European Physical Journal Plus 134 (2019) 5, art. no. 194.

163. Flavor constraints on electroweak ALP couplings, Gavela, M.B., Houtz, R., Quilez, P., Rey, R., Sumensari, O. European Physical Journal C 79 (2019) 5, art. no. 369.

164. Proton decay at one loop, Helo, J.C., Hirsch, M., Ota, T. Physical Review D 99 (2019) 9, art. no. 095021.

165. Dark matter interpretation of the ANITA anomalous events, Heurtier, L., Mambrini, Y., Pierre, M. Physical Review D 99 (2019) 9, art. no. 095014.

166. 6d SCFTs, 5d dualities and Tao web diagrams, Hayashi, H., Kim, S.-S., Lee, K., Yagi, F. Journal of High Energy Physics 5 (2019) 203.

167. Steve: A Hierarchical Bayesian Model for Supernova Cosmology Hinton, S.R., et al including Avila, S., García-Bellido, J. Astrophysical Journal 876 (2019) 1, art. no. 15.

168. Weak-lensing analysis of SPT-selected galaxy clusters using Dark Energy Survey Science Verification data, Stern, C., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 485 (2019) 1, pp. 69-87.

169. First cosmology results using Type Ia supernova from the Dark Energy Survey: Simulations to correct supernova distance biases, Kessler, R., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 485 (2019) 1, 1171-1187.

170. Cosmological Constraints from Multiple Probes in the Dark Energy Survey, DES Collaboration including Avila, S., García-Bellido, J. Physical Review Letters 122 (2019) 17, art. no. 171301, .

171. First Measurement of the Hubble Constant from a Dark Standard Siren using the Dark Energy Survey Galaxies and the LIGO/Virgo Binary-Black-hole Merger GW170814, Soares-Santos, M., et al including Garcia-Bellido, J. Astrophysical Journal Letters 876 (2019) 1, art. no. L7.

172. Constraints on mediator-based dark matter and scalar dark energy models using âˆšs = 13 TeV pp collision data collected by the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 5 (2019) 142.

Artículos / Papers 2019

173. Measurement of VH, H -> b bbar production as a function of the vector-boson transverse momentum in 13 TeV pp collisions with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 5 (2019) 141.

174. Search for large missing transverse momentum in association with one top-quark in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 5 (2019) 41.

175. Combinations of single-top-quark production cross-section measurements and |f LV Vtb| determinations at âˆšs = 7 and 8 TeV with the ATLAS and CMS experiments, The ATLAS collaboration, The CMS collaboration, including Aguilar-Saavedra, J.A. Journal of High Energy Physics 5 (2019) 88.

176. The full-sky angular bispectrum in redshift space, Dio, E.D., Durrer, R., Maartens, R., Montanari, F., Umeh, O. Journal of Cosmology and Astroparticle Physics 4 (2019) 053.

177. Probing isospin symmetry in the (Fe 50, Mn 50, Cr 50) isobaric triplet via electromagnetic transition rates, Giles, M.M., including Poves, A. Physical Review C 99 (2019) 4, art. no. 044317, .

178. More out of less: An excess integrated Sachs-Wolfe signal from supervoids mapped out by the Dark Energy Survey, Kovacs, A., et al including García-Bellido, J., Avila, S. Monthly Notices of the Royal Astronomical Society 484 (2019) 4, pp. 5267-5277.

179. Finding high-redshift strong lenses in DES using convolutional neural networks, Jacobs, C., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 484 (2019) 4, pp. 5330-5349.

180. Rediscovery of the Sixth Star Cluster in the Fornax Dwarf Spheroidal Galaxy, Wang, M.Y., et al including García-Bellido, J. Astrophysical Journal Letters 875 (2019) 2, art. no. L13.

181. Emerging chromo-natural inflation, Domcke, V., Mares, B., Muia, F., Pieroni, M. Journal of Cosmology and Astroparticle Physics 4 (2019), art. no. 034.

182. Search for the Production of a Long-Lived Neutral Particle Decaying within the ATLAS Hadronic Calorimeter in Association with a Z Boson from pp Collisions at s =13 TeV, The ATLAS collaboration, including Aguilar-Saavedra, J.A. Physical Review Letters, 122 (2019) 15, art. no. 151801.

183. The PAU survey: Early demonstration of photometric redshift performance in the COSMOS field, Eriksen, M., et al including Garcia-Bellido, J. Monthly Notices of the Royal Astronomical Society 484 (2019) 3, pp. 4200-4215.

184. Universal Origin of Boson Peak Vibrational Anomalies in Ordered Crystals and in Amorphous Materials, Baggioli, M., Zaccone, A. Physical Review Letters 122 (2019) 14, art. no. 145501.

185. Multimessenger Multi-TeV Dark Matter, Gammaldi, V. Frontiers in Astronomy & Space Sciences, 6(2019) 19.

186. On the maximal strength of a first-order electroweak phase transition and its gravitational wave signal, Ellis, J., Lewicki, M., No, J.M. Journal of Cosmology and Astroparticle Physics 4 (2019) 003.

187. The Riemann zeros as spectrum and the Riemann hypothesis, Sierra, G. Symmetry 11 (2019) 4, art. . 494.

188. T-branes and defects, Marchesano, F., Savelli, R., Schwieger, S. J. High Energy Physics 4(2019)110.

189. Calibrating the naïve Cornell model with NRQCD, Mateu, V., Ortega, P.G., Entem, D.R., Fernández, F. European Physical Journal C 79 (2019) 4, art. no. 323.

190. Supersymmetry breaking warped throats and the weak gravity conjecture, Buratti, G., García-Valdecasas, E., Uranga, A.M. Journal of High Energy Physics 4 (2019) 111.

191. The PAU Survey: Operation and orchestration of multi-band survey data, Tonello, N., et al including Garcia-Bellido, J. Astronomy and Computing 27 (2019) pp. 171-188.

192. Dark Energy Survey Year 1 Results: Detection of Intracluster Light at Redshift \sim 0.25, Zhang, Y., et al including Avila, S., García-Bellido, J. Astrophysical Journal 874 (2019) 2, art. no. 165.

193. First Cosmology Results Using SNe Ia from the Dark Energy Survey: Analysis, Systematic Uncertainties, and Validation, Brout, D., et al including Avila, S., García-Bellido, J. Astrophysical Journal 874 (2019) 2, art. no. 150.

194. Measurement of the ratio of cross sections for inclusive isolated-photon production in pp collisions at sqrt(s) = 13 and 8 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 4 (2019) 93.

Artículos / Papers 2019

195. Study of the rare decays of B s 0 and B 0 mesons into muon pairs using data collected during 2015 and 2016 with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 4 (2019) 98.

196. Measurement of the four-lepton invariant mass spectrum in 13 TeV proton-proton collisions with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 4 (2019) 48.

197. Measurements of inclusive and differential fiducial cross-sections of ttbar production with additional heavy-flavour jets in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 4 (2019) 46.

198. The clustering of galaxies in the completed SDSS-III Baryon Oscillation Spectroscopic Survey: A tomographic measurement of structure growth and expansion rate from anisotropic galaxy clustering in Fourier space , Zheng, J., Zhao, G.-B., Li, J., Wang, Y., Chuang, C.-H., Kitaura, F.-S., Rodriguez-Torres, S. Monthly Notices of the Royal Astronomical Society 484 (2019) 1, pp. 442-450.

199. Transfer learning for galaxy morphology from one survey to another, Domínguez Sanchez, H., et al including Avila, S., García-Bellido, Monthly Notices of the Royal Astronomical Society 484 (2019) 1, pp. 93-100.

200. First Cosmology Results Using Type Ia Supernovae from the Dark Energy Survey: Photometric Pipeline and Light-curve Data Release, Brout, D., et al including Avila, S., Garcia-Bellido, J. Astrophysical Journal 874 (2019) 1, art. no. 106.

201. Can the homogeneity scale be used as a standard ruler?, Nesseris, S., Trashorras, M. Physical Review D 99 (2019) 6, art. no. 063539.

202. Robust cosmic-ray constraints on p-wave annihilating MeV dark matter, Boudaud, M., Lacroix, T., Stref, M., Lavalle, J. Physical Review D 99 (2019) 6, art. no. 061302.

203. Search for low-mass dark matter with CDMSlite using a profile likelihood fit, SuperCDMS Collaboration including Cerdeño, D.G. Physical Review D 99 (2019) 6, art. no. 062001.

204. Evidence for color dichotomy in the primordial Neptunian Trojan population, Lin, H.W., et al including Avila, S., García-Bellido, J. Icarus 321 (2019) pp. 426-435.

205. First cosmology results using Type IA supernovae from the dark energy survey: Effects of chromatic corrections to supernova photometry on measurements of cosmological parameters, Lasker, J., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 485 (2019) 4, pp. 5329-5344.

206. Is every strong lens model unhappy in its own way? Uniform modelling of a sample of 13 quadruply+ imaged quasars Shajib, A.J., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 483 (2019) 4, pp. 5649-5671.

207. Dark Energy Survey Year 1 results: Measurement of the baryon acoustic oscillation scale in the distribution of galaxies to redshift 1, Abbott, T.M.C., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 483 (2019) 4, pp. 4866-4883.

208. The cosmic-ray spectra: News on their knees, De RÃºjula, A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 790 (2019) pp. 444-452.

209. Electroweak superpartners scrutinized at the LHC in events with multi-leptons, Lara, I., López-Fogliani, D.E., Muñoz, C. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 790 (2019) pp. 176-183.

210. Renormalization group flows for Wilson-Hubbard matter and the topological Hamiltonian, Tirrito, E., Rizzi, M., Sierra, G., Lewenstein, M., Bermudez, A. Physical Review B 99 (2019) 12, art. no. 125106.

211. The twisted gradient flow coupling at one loop, Bribián, E.I., García Pérez, M. Journal of High Energy Physics 3 (2019) 200.

212. Axion couplings to electroweak gauge bosons, Alonso-Ávarez, G., Gavela, M.B., Quilez, P. European Physical Journal C 79 (2019) 3, art. no. 223.

213. Low frequency propagating shear waves in holographic liquids, Baggioli, M., Trachenko, K. Journal of High Energy Physics 3 (2019) 93.

Artículos / Papers 2019

214. Bivo phenomenology at the LHC, Gehrlein, J., Ipek, S., Fox, P.J. Journal of High Energy Physics 3 (2019) 73.

215. Accelerating the BSM interpretation of LHC data with machine learning, Bertone, G., Deisenroth, M.P., Kim, J.S., Liem, S., Austri, R.R.D., Welling, M. Physics of the Dark Universe 24 (2019) 100293.

216. Cosmology with a very light L mu - L \tau gauge boson, Escudero, M., Hooper, D., Krnjaic, G., Pierre, M. Journal of High Energy Physics 3 (2019) 71.

217. Candidate massive galaxies at z \sim 4 in the Dark Energy Survey Guarnieri, P., et al including Garcia-Bellido, J. Monthly Notices of the Royal Astronomical Society 483 (2019) 3, pp. 3060-3081.

218. Search for long-lived particles produced in pp collisions at s =13 TeV that decay into displaced hadronic jets in the ATLAS muon spectrometer, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 5, art. no. 052005.

219. Search for heavy long-lived multicharged particles in proton-proton collisions at s =13 TeV using the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 5, art. no. 052003.

220. Properties of g -> b b at small opening angles in pp collisions with the ATLAS detector at sqrt(s)=13 TeV, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 5, art. no. 052004.

221. Search for four-top-quark production in the single-lepton and opposite-sign dilepton final states in pp collisions at s =13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 5, art. no. 052009.

222. Unusual area-law violation in random inhomogeneous systems, Alba, V., Santalla, S.N., Ruggiero, P., Rodriguez-Laguna, J., Calabrese, P., Sierra, G. Journal of Statistical Mechanics: Theory and Experiment 2 (2019) 023105.

223. Universality of Squashed-Sphere Partition Functions, Bueno, P., Cano, P.A., Hennigar, R.A., Mann, R.B. Physical Review Letters 122 (2019) 7, art. no. 071602.

224. Regular stringy black holes?, Cano, P.A., Chimento, S., Ortín, T., Ruipérez, A. Physical Review D 99 (2019) 4, art. no. 046014.

225. Unraveling the effective fluid approach for f (R) models in the subhorizon approximation, Arjona, R., Cardona, W., Nesseris, S. Physical Review D 99 (2019) 4, art. no. 043516.

226. The PAU survey: Star-galaxy classification with multi narrow-band data, Cabayol, L., et al including García-Bellido, Monthly Notices of the Royal Astronomical Society 483 (2019) 1, pp. 529-539.

227. Constraining R-axion models through dijet searches at the LHC, Arganda, E., Medina, A.D., Mileo, N.I., Morales, R.A., Szynkman, A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 789 (2019) pp. 575-581.

228. Beyond the near-horizon limit: stringy corrections to heterotic black holes, Cano, P.A., Chimento, S., Meessen, P., Ortín, T., Ramírez, P.F., Ruipérez, A. Journal of High Energy Physics 2 (2019), art. no. 192.

229. Standard model EFT and the Drell-Yan process at high energy, Dawson, S., Giardino, P.P., Ismail, A. Physical Review D 99 (2019) 3, art. no. 035044.

230. Updating bounds on R-parity violating supersymmetry from meson oscillation data, Domingo, F., Dreiner, H.K., Kim, J.S., Krauss, M.E., Lozano, V.M., Wang, Z.S. Journal of High Energy Physics (2019) 2, art. no. 66.

231. Non-unitary evolution of neutrinos in matter and the leptonic unitarity test, Fong, C.S., Minakata, H., Nunokawa, H. Journal of High Energy Physics 2 (2019) art. no. 15.

232. Supersymmetric models in light of improved Higgs mass calculations, Bagnaschi, E., Bahl, H., Ellis, J., Evans, J.L., Hahn, T., Heinemeyer, S., Hollik, W., Olive, K.A., Pabehr, S., Rzehak, H., Sobolev, I.V., Weiglein, G., Zheng, J. European Physical Journal C 79 (2019) 2 art. no. 149.

233. Dark Energy Survey Year 1 results: Methodology and projections for joint analysis of galaxy clustering, galaxy lensing, and CMB lensing two-point functions, Baxter, E.J., et al including Avila, S., García-Bellido, J. Physical Review D 99 (2019) 2, art. no. 023508.

234. Measuring linear and non-linear galaxy bias using counts-in-cells in the Dark Energy Survey Science Verification data Salvador, A.I., et al including García-Bellido, J., Avila, S. Monthly Notices of the Royal Astronomical Society 482 (2019) 2, pp. 1435-1451.

Artículos / Papers 2019

235. Dark Energy Survey year 1 results: Galaxy sample for BAO measurement, Crocce, M., et al including Avila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 482 (2019) 2, pp. 2807-2822.

236. Structure of Fe 70: Single-particle and collective degrees of freedom, Gade, A., et al including Poves, A., Physical Review C 99 (2019) 1, art. no. 011301.

237. Type IIA flux vacua with mobile D6-branes, Escobar, D., Marchesano, F., Staessens, W. Journal of High Energy Physics 1 (2019) 96.

238. Remnants of galactic subhalos and their impact on indirect dark-matter searches, Stref, M., Lacroix, T., Lavalle, J. Galaxies 7 (2019) 2, art. no. 65.

239. Tuning the hybrid Monte Carlo algorithm using molecular dynamics forces' variances, Bussone, A., Della Morte, M., Drach, V., Pica, C. Computer Physics Communications 234 (2019) pp. 179-187.

240. Quantum Breaking Bound on de Sitter and Swampland, Dvali, G., Gomez, C., Zell, S. Fortschritte der Physik 67 (2019) 1-2, art. no. 1800094.

241. On Exclusion of Positive Cosmological Constant, Dvali, G., Gomez, C. Fortschritte der Physik, 67 (2019) 1-2, art. no. 1800092.

242. Global analysis of three-flavour neutrino oscillations: synergies and tensions in the determination of theta_23 , delta_CP , and the mass ordering, Esteban, I., Gonzalez-Garcia, M.C., Hernandez-Cabezudo, A., Maltoni, M., Schwetz, T. Journal of High Energy Physics 1 (2019) art. no. 106.

243. Spectral and spatial analysis of the dark matter subhalo candidates among Fermi Large Area Telescope unidentified sources, Coronado-Blázquez, J., Sánchez-Conde, M.A., Mauro, M.D., Aguirre-Santaella, A., Ciuca, I., Domínguez, A., Kawata, D., Mirabal, N. Journal of Cosmology and Astroparticle Physics 11 (2019) 045.

244. Probing gravity with a joint analysis of galaxy and CMB lensing and SDSS spectroscopy, Singh, S., Alam, S., Mandelbaum, R., Seljak, U., Rodriguez-Torres, S., Ho, S. Monthly Notices of the Royal Astronomical Society 482 (2019) 1, pp. 785-806.

245. The Physics of the Accelerating Universe Camera, Padilla, C., et al including García-Bellido, J. Astronomical Journal 157 (2019) 6, art. no. 246.

246. Properties of low-lying states in Co 65 from lifetime measurements, Olaizola, B., et al, including Poves, A. Physical Review C 99 (2019) 2, art. no. 024321.

247. Production rate measurement of Tritium and other cosmogenic isotopes in Germanium with CDMSlite, Agnese, R., et al including Cerdeño, D.G. Astroparticle Physics 104 (2019) pp. 1-12.

248. An Extended Catalog of Galaxy-Galaxy Strong Gravitational Lenses Discovered in des Using Convolutional Neural Networks, Jacobs, C., et al including Avila, S., García-Bellido, J. Astrophysical Journal, Supplement Series 243 (2019) 1, art. no. 17.

249. Astrometry and Occultation Predictions to Trans-Neptunian and Centaur Objects Observed within the Dark Energy Survey, Banda-Huarca, M.V., et al including Avila, S., GarcÃa-Bellido, J. Astronomical Journal 157 (2019) 3, art. no. 120.

250. Identification of RR Lyrae Stars in Multiband, Sparsely Sampled Data from the Dark Energy Survey Using Template Fitting and Random Forest Classification, Yanny, B., et al, including Garcia-Bellido, J. Astronomical Journal 158 (2019) 1, art. no. 16.

251. Dark Energy Survey Year 1 results: Weak lensing mass calibration of redMaPPer galaxy clusters, McClintock, T., et al including Avila, S., J., García-Bellido, Monthly Notices of the Royal Astronomical Society 482 (2019) 1, pp. 1352-1378.

252. A Search for Optical Emission from Binary Black Hole Merger GW170814 with the Dark Energy Camera, Doctor, Z., et al including García-Bellido, J., Avila, S., Astrophysical Journal Letters 873 (2019) 2, art. n. L24.

253. Mass Calibration of Optically Selected des Clusters Using a Measurement of CMB-cluster Lensing with SPTpol Data, Raghunathan, S., et al including Avila, S., García-Bellido, J. Astrophysical Journal 872 (2019) 2, art. no. 170.

254. First Cosmology Results using Type Ia Supernovae from the Dark Energy Survey: Constraints on Cosmological Parameters, Abbott, T.M.C., et al including Avila, S., García-Bellido, J. Astrophysical Journal Letters 872 (2019) 2, art. no. L30.

255. Search for pairs of highly collimated photon-jets in pp collisions at s =13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Physical Review D 99 (2019) 1, art. no. 012008.

Artículos / Papers 2020

1. Growth of genuine multipartite entanglement in random unitary circuits, Bera, A., Singha Roy, S. Physical Review A (2020) 102 (6), art. no. 062431
2. The anomalous magnetic moment of the muon in the Standard Model, Aoyama, T. et al, including Herdoíza, G. Physics Reports 887 (2020) pp. 1-166.
3. Constraints on the distance duality relation with standard sirens, Hogg, N.B., Martinelli, M., Nesseris, S. Journal of Cosmology and Astroparticle Physics 12 (2020) 019
4. Pair production and gravity as the weakest force, Gonzalo, E., Ibáñez, L.E. Journal of High Energy Physics 12 (2020) 39.
5. Revisiting the Experimental Test of Mermin's Inequalities at IBMQ, González, D., de la Pradilla, D.F., González, G. International Journal of Theoretical Physics, 59 (2020) 12, pp. 3756-3768.
6. An effective field theory approach for electroweak interactions in the high energy limit, Gómez Bock, M., Hentschinski, M., Sabio Vera, A. European Physical Journal C 80 (2020) 12, art. no. 1193, .
7. Contact metric three manifolds and Lorentzian geometry with torsion in six-dimensional supergravity, Murcia, Á, Shahbazi, C.S. Journal of Geometry and Physics 158 (2020) art. no. 103868.
8. Solar neutrino probes of the muon anomalous magnetic moment in the gauged U(1)L\mu L\tau Amaral, D.W.P., Cerdeño, D.G., Foldenauer, P., Reid, E. Journal of High Energy Physics 12 (2020) 155.
9. Full-sky bispectrum in redshift space for 21cm intensity maps, Durrer, R., Jalilvand, M., Kothari, R., Maartens, R., Montanari, F. Journal of Cosmology and Astroparticle Physics 12 (2020) 003.
10. Searching for supersymmetry: the mu nu SSM: A short review, López-Fogliani, D.E., Muñoz, C. European Physical Journal: Special Topics 229 (2020) 21, pp. 3263-3301.
11. Electro-magnetic energy extraction from rotating black holes in AdS, Callebaut, N., Rodriguez, M.J., Verlinde, H. Journal of High En. Physics 12 (2020) 18.
12. Probing lepton flavor models at future neutrino experiments, Blennow, M., Ghosh, M., Ohlsson, T., Titov, A. Physical Review D 102 (2020) 11, art. no. 115004.
13. HiggsBounds-5: testing Higgs sectors in the LHC 13 TeV Era, Bechtle, P., Dercks, D., Heinemeyer, S., Klingl, T., Stefaniak, T., Weiglein, G., Wittbrodt, J. European Physical Journal C 80 (2020) 12, art. no. 1211.
14. Addendum to: Improved global fit to non-standard neutrino interactions using COHERENT energy and timing data, Coloma, P., Esteban, I., Gonzalez-Garcia, M.C., Maltoni, M. Journal of High Energy Physics 12 (2020) 71.
15. Galactic center constraints on self-interacting sterile neutrinos from fermionic dark matter ("ino") models, Yunis, R., Argüelles, C.R., Mavromatos, N.E., Moliné, A., Krut, A., Carinci, M., Rueda, J.A., Ruffini, R. Physics of the Dark Universe 30 (2020) 100699.
16. The Prime state and its quantum relatives, García-Martín, D., Ribas, E., Carrazza, S., Latorre, J.I., Sierra, G. Quantum (2020) 4, .
17. MINOT: Modeling the intracluster medium (non-) thermal content and observable prediction tools, Adam, R., Goksu, H., Leingärtner-Goth, A., Ettori, S., Gnatyk, R., Hnatyk, B., Hütten, M., Pérez-Romero, J., Sánchez-Conde, M.A., Sergijenko, O. Astronomy and Astrophysics 644 (2020) A70.
18. Building models of inflation in no-scale supergravity, Ellis, J., Garciá, M.A.G., Nagata, N., Nanopoulos, D.V., Olive, K.A., Verner, S. International Journal of Modern Physics D, 29 (2020) 16, art. no. 2030011.
19. The Completed SDSS-IV extended Baryon Oscillation Spectroscopic Survey: Exploring the halo occupation distribution model for emission line galaxies, Ávila, S. et al, Monthly Notices of the Royal Astronomical Society 499 (2020) 4, pp. 5486-5507.
20. The completed SDSS-IV extended baryon oscillation spectroscopic survey: Growth rate of structure measurement from anisotropic clustering analysis in configuration space between redshift 0.6 and 1.1 for the emission-line galaxy sample, Tamone, A. et al including Ávila, S. Monthly Notices of the Royal Astronomical Society 499 (2020) 4, pp. 5527-5546.
21. Increasing the census of ultracool dwarfs in wide binary and multiple systems using Dark Energy Survey DR1 and Gaia DR2 data, Dal Ponte, M. et al including Ávila, S. Monthly Notices of the Royal Astronomical Society 499 (2020) 4, pp. 5302-5317.

Artículos / Papers 2020

22. Candidate periodically variable quasars from the Dark Energy Survey and the Sloan Digital Sky Survey, Chen, Y.-C. et al including S., Ávila, S. Monthly Notices of the Royal Astronomical Society 499 (2020) 2, pp. 2245-2264.

23. Euclid: Forecast constraints on the cosmic distance duality relation with complementary external probes, Euclid collaboration, including Martinelli, M. Nesseris, Astronomy and Astrophysics 644 (2020) A80, .

24. First cosmology results using supernovae ia from the dark energy survey: Survey overview, performance, and supernova spectroscopy, Smith, M. et al, including Ávila, S., García-Bellido, J., Astronomical Journal 160 (2020) 6, art. no. abc01b.

25. First results on ProtoDUNE-SP liquid argon time projection chamber performance from a beam test at the CERN Neutrino Platform, DUNE collaboration including Fernandez-Martinez, E. Journal of Instrumentation 15 (2020) 12, art. no. P12004.

26. Cosmological constraints on nonadiabatic dark energy perturbations , Arjona, R., García-Bellido, J., Nesseris, S. Physical Review D 102 (2020) 10, art. no. 103526.

27. Anharmonic phonon damping enhances the Tc of BCS-type superconductors, Setty, C., Baggioli, M., Zaccone, A. Physical Review B 102 (2020) 17, art. no. 174506, .

28. Out of equilibrium chiral vortical effect in holography, Morales-Tejera, S., Landsteiner, K. Physical Review D 102 (2020) 10, art. no. 106020, .

29. Constraints on low-mass, relic dark matter candidates from a surface-operated SuperCDMS single-charge sensitive detector, Amaral, D.W. et al including Cerdeño, D.G., Physical Review D 102 (2020) 9, art. no. 091101, .

30. Neutrino interaction classification with a convolutional neural network in the DUNE far detector, DUNE collaboration including Fernandez-Martinez, E. Physical Review D 102 (2020) 9, art. no. 092001, .

31. Effective field theory for quasicrystals and phasons dynamics, Baggioli, M., Landry, M. SciPost Physics 9 (2020) 5, art. no. 062, .

32. Proof of a momentum/complexity correspondence, Barbón, J.L.F., Martín-García, J., Sasieta, M. Physical Review D 102 (2020) 10, art. no. 101901.

33. Hints of dark energy anisotropic stress using machine learning, Arjona, R., Nesseris, S. Journal of Cosmology and Astroparticle Physics 11 (2020) 042.

34. Systematics of type IIA moduli stabilisation, Marchesano, F., Prieto, D., Quirant, J., Shukla, P. Journal of High Energy Physics 11 (2020) 113.

35. Lepton number violating operators with standard model gauge fields: a survey of neutrino masses from 3-loops and their link to dark matter, Gustafsson, M., No, J.M., Rivera, M.A. Journal of High Energy Physics 11 (2020) 70.

36. A vanishing theorem for T-branes, Marchesano, F., Moraru, R., Savelli, R. Journal of High Energy Physics 11 (2020) 2.

37. Gravitational wave spectrum from kinks on infinite cosmic strings with Y-junctions, Matsui, Y., Horiguchi, K., Nitta, D., Kuroyanagi, S. Journal of Cosmology and Astroparticle Physics 11 (2020) 039.

38. The H0 tension: \Delta GN vs. Delta Neff, Ballesteros, G., Notari, A., Rompineve, F. Journal of Cosmology and Astroparticle Physics 11 (2020) 024.

39. Anisotropic deformations in a class of projectively-invariant metric-affine theories of gravity, Jiménez, J.B., Andrés, D.D., Delhom, A. Classical and Quantum Gravity 37 (2020) 22, art. no. 225013.

40. Indirect CP probes of the Higgs-top-quark interaction: current LHC constraints and future opportunities, Bahl, H., Bechtle, P., Heinemeyer, S., Katzy, J., Klingl, T., Peters, K., Saimpert, M., Stefaniak, T., Weiglein, G. Journal of High Energy Physics 11 (2020) 127.

41. Cosmic imprints of XENON1T axions, Arias-Aragón, F., D'Eramo, F., Ferreira, R.Z., Merlo, L., Notari, A. Journal of Cosmology and Astroparticle Physics 11 (2020) 025.

42. Quantum Theory of Triboelectricity, Alicki, R., Jenkins, A. Physical Review Letters 125 (2020) 18, art. no. 186101.

43. Electromagnetic quasitopological gravities, Cano, P.A., Murcia, Á. Journal of High Energy Physics, 10 (2020) 125.

Artículos / Papers 2020

44. \mu* masses: Weak-lensing calibration of the dark energy survey year 1 redMaPPer clusters using stellar masses, DES collaboration including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 498 (2020) 4, pp. 5450-5467.

45. STRIDES: Spectroscopic and photometric characterization of the environment and effects of mass along the line of sight to the gravitational lenses des J0408-5354 and WGD 2038-4008, Buckley-Geer, E.J., et al including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 498 (2020) 3, pp. 3241-3274.

46. A DESGW Search for the Electromagnetic Counterpart to the LIGO/Virgo Gravitational-wave Binary Neutron Star Merger Candidate S190510g, DES collaboration including García-Bellido, J., Ávila, S. Astrophysical Journal 903 (2020) 1, art. no. 75, .

47. Euclid: The importance of galaxy clustering and weak lensing cross-correlations within the photometric Euclid survey, Euclide collaboration including Martinelli, M. Astronomy and Astrophysics 643 (2020) aa38313.

48. Reconstruction and identification of boosted di-Ï„ systems in a search for Higgs boson pairs using 13 TeV proton-proton collision data in ATLAS, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 11 (2020) 163.

49. Performance of the upgraded PreProcessor of the ATLAS Level-1 Calorimeter Trigger, ATLAS Collaboration including Aguilar-Saavedra, J.A. Journal of Instrumentation 15 (2020) 11, art. no. P11016, .

50. Search for new non-resonant phenomena in high-mass dilepton final states with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 11 (2020) 5.

51. Anatomy of Higgs boson decays into gamma gamma and gamma z within the electroweak chiral Lagrangian in the R\xi gauges, Herrero, M., Morales, R.A. Physical Review D 102 (2020) 7, art. no. 075040.

52. Dark Energy Survey Year 3 results: Cosmology with moments of weak lensing mass maps - Validation on simulations, DES collaboration, including Ávila, S., J., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 498 (2020) 3, pp. 4060-4087.

53. Remarks on the thermodynamic stability of TTÂ¯ deformations, Barbón, J.L.F., Rabinovici, E. Journal of Physics A: Mathematical and Theoretical 53 (2020) 42, art. no. 424001, .

54. Case for decaying spin- 3/2 dark matter, Garcia, M.A.G., Mambrini, Y., Olive, K.A., Verner, S. Physical Review D 102 (2020) 8, art. no. 083533.

55. UV completion of an axial, leptophobic, Z′, Casas, J.A., Chakraborti, M., Quilis, J. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 809 (2020) 135721.

56. Detecting dark matter around black holes with gravitational waves: Effects of dark-matter dynamics on the gravitational waveform, Kavanagh, B.J., Nichols, D.A., Bertone, G., Gaggero, D. Physical Review D 102 (2020) 8, art. no. 083006.

57. T duality and Wald entropy formula in the Heterotic Superstring effective action at first-order in Î±â€², Elgood, Z., Ortín, T. Journal of High Energy Physics 10 (2020) 97.

58. Masses and electric charges: gauge anomalies and anomalous thresholds, Gómez, C., Letschka, R. European Physical Journal C 80 (2020) 10, art. n. 946.

59. Cherenkov Telescope Array sensitivity to branon dark matter models, Aguirre-Santaella, A., Gammaldi, V., Sánchez-Conde, M.A., Nieto, D. Journal of Cosmology and Astroparticle Physics 10 (2020) 041.

60. Carroll versus Galilei from a brane perspective, Bergshoeff, E., Izquierdo, J.M., Romano, L. Journal of High Energy Physics 10 (2020) 66.

61. A cubic deformation of ABJM: the squashed, stretched, warped, and perturbed gets invaded, Cesaro, M., Larios, G., Varela, O. Journal of High Energy Physics 10 (2020) 41.

62. A note on membrane interactions and the scalar potential, Herráez, A. Journal of High Energy Physics 10 (2020) 9.

63. \nu electroweak baryogenesis, Fernández-Martínez, E., López-Pavón, J., Ota, T., Rosauro-Alcaraz, S. Journal of High Energy Physics 10 (2020) 63.

64. Massive event-shape distributions at N2LL, Bris, A., Mateu, V., Preisser, M. Journal of High Energy Physics 9 (2020) 132.

Artículos / Papers 2020

65. Improved (g- 2) \mu measurements and supersymmetry, Chakraborti, M., Heinemeyer, S., Saha, I. European Physical Journal C 80 (2020) 10, art. no. 984.

66. Dark matter from primordial quantum information, Gómez, C., Jimenez, R. Journal of Cosmology and Astroparticle Physics 10 (2020) A4.

67. HL-LHC and ILC sensitivities in the hunt for heavy Higgs bosons, Bahl, H., Bechtle, P., Heinemeyer, S., Liebler, S., Stefaniak, T., Weiglein, G. European Physical Journal C 80 (2020) 10, art. no. 916.

68. Hybrid-basis inference for large-scale galaxy clustering: combining spherical and Cartesian Fourier analyses, Wang, M.S., Ávila, S., Bianchi, D., Crittenden, R., Percival, W.J. Journal of Cosmology and Astroparticle Physics 10 (2020) 022.

69. Predicting the dark matter velocity distribution in galactic structures: Tests against hydrodynamic cosmological simulations, Lacroix, T., Núñez-Castiñeyra, A., Stref, M., Lavalle, J., Nezri, E. Journal of Cosmology and Astroparticle Physics 10 (2020) 031.

70. The PAU Survey: Photometric redshifts using transfer learning from simulations, PAUS collaboration including Garcia-Bellido, J. Monthly Notices of the Royal Astronomical Society 497 (2020) 4, pp. 4565-4579.

71. [O II] emitters in MultiDark-Galaxies and DEEP2, Favole, G. Et al including Stoppacher, D. Monthly Notices of the Royal Astronomical Society 497 (2020) 4, pp. 5432-5453.

72. Optical follow-up of gravitational wave triggers with DECam during the first two LIGO/VIRGO observing runs, Herner, K., et al including Garcia-Bellido, J. Astronomy and Computing 33 (2020) 100425.

73. Validation of selection function, sample contamination and mass calibration in galaxy cluster samples, Grandis, S., et al including Garcia-Bellido, J. Monthly Notices of the Royal Astronomical Society 498 (2020) 1, pp. 771-798.

74. Long-baseline neutrino oscillation physics potential of the DUNE experiment: DUNE Collaboration, including Fernandez-Martinez, E. European Physical Journal C 80 (2020) 10, art. no. 978.

75. Search for pairs of scalar leptoquarks decaying into quarks and electrons or muons in sqrt(s) = 13 TeV pp collisions with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 10 (2020) 112.

76. Search for ttbar resonances in fully hadronic final states in pp collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 10 (2020) 61.

77. Search for direct production of electroweakinos in final states with missing transverse momentum and a Higgs boson decaying into photons in pp collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration, including Aguilar-Saavedra, J.A., Journal of High Energy Physics 10 (2020) 5.

78. Energy-momentum portal to dark matter and emergent gravity, Anastasopoulos, P., Kaneta, K., Mambrini, Y., Pierre, M. Physical Review D 102 (2020) 5, art. no. 055019, .

79. Constraints on the Physical Properties of GW190814 through Simulations Based on DECam Follow-up Observations by the Dark Energy Survey, Morgan, R., et al including García-Bellido, J., Ávila, S. Astrophysical Journal 901 (2020) 1, art. no. 83.

80. Erratum: Elasticity bounds from effective field theory [Phys. Rev. D 100, 065015 (2019)], Alberte, L., Baggioli, M., Castillo, V.C., Pujolás, O. Physical Review D 102 (2020) 6, art. no. 069901.

81. Cosmology from quantum information, Gómez, C., Jimenez, R. Physical Review D 102 (2020) 6, art. no. 063511.

82. X-ray and gamma-ray limits on the primordial black hole abundance from Hawking radiation, Ballesteros, G., Coronado-Blázquez, J., Gaggero, D. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 808 (2020) 135624.

83. On the hydrodynamic description of holographic viscoelastic models, Ammon, M., Baggioli, M., Gray, S., Grieninger, S., Jain, A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 808 (2020) 135691.

84. Non-hermitian holography, Areán, D., Landsteiner, K., Landea, I.S. SciPost Physics 9 (2020) 3, art. no. 032.

Artículos / Papers 2020

85. A Statistical Standard Siren Measurement of the Hubble Constant from the LIGO/Virgo Gravitational Wave Compact Object Merger GW190814 and Dark Energy Survey Galaxies, Palmese, A., et al including Garcia-Bellido, J., Ávila, S. Astrophysical Journal Letters 900 (2020) 2, art. no. L33.

86. The first law of black hole mechanics in the Einstein-Maxwell theory revisited, Elgood, Z., Meessen, P., Ortín, T. Journal of High Energy Physics 9 (2020) 26.

87. On simple analytic models of microlensing amplification statistics, Fleury, P., García-Bellido, J. Physics of the Dark Universe 29 (2020) 100567.

88. Exploring sizable triple Higgs couplings in the 2HDM, Arco, F., Heinemeyer, S., Herrero, M.J. European Physical Journal C 80 (2020) 9, art. no. 884.

89. Data driven flavour model, Arias-Aragón, F., Bouthelier-Madre, C., Cano, J.M., Merlo, L. European Physical Journal C 80 (2020) 9, art. no. 854.

90. Black rubber and the non-linear elastic response of scale invariant solids, Baggioli, M., Castillo, V.C., Pujolás, O. Journal of High Energy Physics 9 (2020) 13.

91. Latest evidence for a late time vacuum-geodesic CDM interaction, Hogg, N.B., Bruni, M., Crittenden, R., Martinelli, M., Peirone, S. Physics of the Dark Universe 29 (2020) 100583.

92. Magnetophonons & type-B Goldstones from hydrodynamics to holography, Baggioli, M., Grieninger, S., Li, L. Journal of High Energy Physics 9 (2020) 37.

93. Modelling the Milky Way-I. Method and first results fitting the thick disc and halo with DES-Y3 data, Pieres, A., et al including Ávila, S., J., García-Bellido, Monthly Notices of the Royal Astronomical Society 497 (2020) 2, pp. 1547-1562.

94. Searching for long-lived particles beyond the Standard Model at the Large Hadron Collider, Alimena, J., et al including Lara, I. Journal of Physics G: Nuclear and Particle Physics, 47 (2020) 9, art. no. 090501.

95. Dust Reverberation Mapping in Distant Quasars from Optical and Mid-infrared Imaging Surveys, Yang, Q., et al including Ávila, S., Garcia-Bellido, J., Astrophysical Journal 900 (2020) 1, art. no. 58.

96. Non-minimal tinges of Unimodular Gravity, Herrero-Valea, M., Santos-Garcia, R. Journal of High Energy Physics 9 (2020) 41.

97. Noise from undetected sources in Dark Energy Survey images, Eckert, K., et al including Ávila, S., García-Bellido, Monthly Notices of the Royal Astronomical Society 497 (2020) 3, pp. 2529-2539.

98. Isospin symmetry breaking in the mirror pair Sr 73-Br 73, Lenzi, S.M., Poves, A., MacChiavelli, A.O. Physical Review C 102 (2020) 3, art. no. 031302.

99. The fate of hints: updated global analysis of three-flavor neutrino oscillations, Esteban, I., Gonzalez-Garcia, M.C., Maltoni, M., Schwetz, T., Zhou, A. Journal of High Energy Physics 9 (2020) 178.

100. Dynamics of one-dimensional quantum many-body systems in time-periodic linear potentials, Colcelli, A., Mussardo, G., Sierra, G., Trombettoni, A. Physical Review A 102 (2020) 3, art. no. 033310.

101. Dark matter constraints from dwarf galaxies with data-driven J-factors, Alvarez, A., Calore, F., Genina, A., Read, J., Serpico, P.D., Zaldivar, B. Journal of Cosmology and Astroparticle Physics 9 (2020) 004.

102. Brane-jet stability of non-supersymmetric AdS vacua, Guarino, A., Tarrío, J., Varela, O. Journal of High Energy Physics 9 (2020) 110.

103. Measurements of inclusive and differential cross-sections of combined ttbar and tW\gamma production in the e\mu channel at 13 TeV with the ATLAS detector, The ATLAS collaboration, including Aguilar-Saavedra, J.A. Journal of High E. Physics 9 (2020) 49.

104. Galactic halo size in the light of recent AMS-02 data, Weinrich, N., Boudaud, M., Derome, L., Génolini, Y., Lavalle, J., Maurin, D., Salati, P., Serpico, P., Weymann-Despres, G. Astronomy and Astrophysics 639 (2020) 202038064.

105. Primordial black holes as dark matter and gravitational waves from single-field polynomial inflation, Ballesteros, G., Rey, J., Taoso, M., Urbano, A. Journal of Cosmology and Astroparticle Physics 7 (2020) 025.

106. Constraints on primordial black holes: The importance of accretion, De Luca, V., Franciolini, G., Pani, P., Riotto, A. Physical Review D 102 (2020) 4, art. no. 043505.

Artículos / Papers 2020

107. Horndeski gravity and standard sirens, Dalang, C., Fleury, P., Lombriser, L. Physical Review D, 102 (2020) 4, art. no. 044036.

108. A non-perturbative approach to the scalar Casimir effect with Lorentz symmetry violation, Escobar, C.A., MartÃn-Ruiz, A., Franca, O.J., G. Garcia, M.A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 807 (2020) art. no. 135567.

109. 6d N = (1, 0) anomalies on S 1 and F-theory implications, Corvilain, P. Journal of High Energy Physics 8 (2020) 133.

110. Machine learning meets the redshift evolution of the CMB temperature, Arjona, R. Journal of Cosmology and Astroparticle Physics 8 (2020) 009.

111. A null test of the equivalence principle using relativistic effects in galaxy surveys, Bonvin, C., Franco, F.O., Fleury, P. Journal of Cosmology and Astroparticle Physics 8 (2020) 004.

112. Dark matter abundance from the sequential freeze-in mechanism, Bélanger, G., Delaunay, C., Pukhov, A., Zaldivar, B. Physical Review D 102 (2020) 3, art. no. 035017.

113. Combination of the W boson polarization measurements in top quark decays using ATLAS and CMS data at sqrt(s) = 8 TeV, The ATLAS collaboration & The CMS collaboration, including Aguilar-Saavedra, Journal of High Energy Physics 8 (2020) 51.

114. On supersymmetric AdS4 orientifold vacua, Marchesano, F., Palti, E., Quirant, J., Tomasiello, A. Journal of High Energy Physics 8 (2020) 87.

115. Stochastic inflationary dynamics beyond slow-roll and consequences for primordial black hole formation, Ballesteros, G., Rey, J., Taoso, M., Urbano, A. Journal of Cosmology and Astroparticle Physics 8 (2020) 043.

116. Volume I. Introduction to DUNE, DUNE collaboration including Fernandez-Martinez, E. Journal of Instrumentation 15 (2020) 8, art. no. T08008

117. Non-relativistic four dimensional p-brane supersymmetric theories and Lie algebra expansion, Romano, L. Classical and Quantum Gravity 37 (2020) 14, art. no. 145016.

118. Determining the nuclear neutron distribution from Coherent Elastic neutrino-Nucleus Scattering: current results and future prospects, Coloma, P., Esteban, I., Gonzalez-Garcia, M.C., Menéndez, J. Journal of High Energy Physics 8 (2020) 30.

119. The impact of spectroscopic incompleteness in direct calibration of redshift distributions for weak lensing surveys, DES Collaboration including Ávila, S., García-Bellido, J., Monthly Notices of the Royal Astronomical Society 496 (2020) 4, pp. 4769-4786.

120. Prospects for fundamental physics with LISA, Barausse, E., et al including Ezquiaga, J.M., Garcia-Bellido, J. General Relativity and Gravitation 52 (2020) 8, art. no. 81.

121. Volume IV. The DUNE far detector single-phase technology, DUNE collaboration including Fernandez-Martinez, E. Journal of Instrumentation 15 (2020) 8, art. no. T08010.

122. Volume III. DUNE far detector technical coordination, DUNE collaboration including Fernandez-Martinez, E. Journal of Instrumentation 15 (2020) 8, art. no. T08009.

123. Performance of the missing transverse momentum triggers for the ATLAS detector during Run-2 data taking, The ATLAS collaboration, including Aguilar-Saavedra, J.A. Journal of High Energy Physics 8 (2020) 80.

124. Field theory of dissipative systems with gapped momentum states, Baggioli, M., Vasin, M., Brazhkin, V.V., Trachenko, K. Physical Review D 102 (2020) 2, art. no. 025012.

125. Dark Energy Survey Year 1 Results: Cosmological constraints from cluster abundances and weak lensing, DES collaboration including Ávila, S., García-Bellido, J. Physical Review D 102 (2020) 2, art. no. 023509.

126. Precise alpha_s determination from charmonium sum rules, Boito, D., Mateu, V. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 806 (2020) 135482.

127. Chemical Analysis of the Ultrafaint Dwarf Galaxy Grus II. Signature of High-mass Stellar Nucleosynthesis, Hansen, T.T., et al including Ávila, S., García-Bellido, Astrophysical Journal 897 (2020) 2, art. no. 183.

Artículos / Papers 2020

128. Massive unimodular gravity, Alvarez, E., Anero, J., Milans Del Bosch, G., Santos-Garcia, R. Classical and Quantum Gravity 37 (2020) 13, art. no. 135001, .

129. The stabilizing effect of gravity made simple, Espinosa, J.R. Journal of Cosmology and Astroparticle Physics 7 (2020) 061.

130. Momentum/Complexity duality and the black hole interior, Barbón, J.L.F., Martín-García, J., Sasieta, M. Journal of High Energy Physics 7 (2020) 169.

131. Universal bounds on transport in holographic systems with broken translations, Baggioli, M., Li, W.-J. SciPost Physics 9 (2020) 1, art. no. 007.

132. Lie algebra expansion and integrability in superstring Sigma-models, Fontanella, A., Romano, L. Journal of High Energy Physics 7) (2020) 83.

133. Dissecting the \Delta I= 1 / 2 rule at large Nc, Donini, A., HernÃ¡ndez, P., Pena, C., Romero-López, F. European Physical Journal C 80 (2020) 7, art. no. 638.

134. How Gaussian can the sky be? Primordial non-Gaussianity from quantum information, Gómez, C., Jimenez, R. Journal of Cosmology and Astroparticle Physics 7 (2020) 047.

135. Gravitational waves from first-order cosmological phase transitions: lifetime of the sound wave source, Ellis, J., Lewicki, M., No, J.M. Journal of Cosmology and Astroparticle Physics 7) (2020) 050.

136. Combined analysis of AMS-02 (Li,Be,B)/C, N/O, 3He, and 4He data, Weinrich, N., Génolini, Y., Boudaud, M., Derome, L., Maurin, D. Astronomy and Astrophysics 639 (2020) A131.

137. Testing lepton flavor models at ESSnuSB, Blennow, M., Ghosh, M., Ohlsson, T., Titov, A. Journal of High Energy Physics 7 (2020) 14.

138. The 16th Data Release of the Sloan Digital Sky Surveys: First Release from the APOGEE-2 Southern Survey and Full Release of eBOSS Spectra, Ahumada, R., et al including Ávila, S. Astrophysical Journal, Supplement Series 249 (2020) 1, art. no. 3.

139. Observation of the associated production of a top quark and a Z boson in pp collisions at âˆšs = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 7 (2020) 124.

140. Search for the HH -> bbbar bbbar process via vector-boson fusion production using proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 7 (2020) 108.

141. Measurements of the production cross-section for a Z boson in association with b-jets in proton-proton collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 7 (2020) 44.

142. What can machine learning tell us about the background expansion of the Universe?, Arjona, R., Nesseris, S. Physical Review D 101 (2020) 12, art. no. 123525.

143. CFT in conformally flat spacetimes. Alvarez, E., Santos-Garcia, R. Physical Review D 101 (2020) 12, art. no. 125009.

144. Melonic dominance in subchromatic sextic tensor models, Prakash, S., Sinha, R. Physical Review D 101 (2020) 12, art. no. 126001.

145. Gapped momentum states, Baggioli, M., Vasin, M., Brazhkin, V., Trachenko, K. Physics Reports, 865 (2020) pp. 1-44.

146. Reheating and post-inflationary production of dark matter, Garcia, M.A.G., Kaneta, K., Mambrini, Y., Olive, K.A. Physical Review D 101 (2020) 12, art. no. 123507.

147. OzDES multi-object fibre spectroscopy for the Dark Energy Survey: Results and second data release, DES collaboration including Ávila, S., García-Bellido, J., Monthly Notices of the Royal Astronomical Society 496 (2020) 1, pp. 19-35.

148. DES16C3cje: A low-luminosity, long-lived supernova, DES collaboration including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 496 (2020) 1, pp. 95-110.

149. Supernova Siblings: Assessing the Consistency of Properties of Type Ia Supernovae that Share the Same Parent Galaxies, Scolnic, D., et al including Ávila, S., García-Bellido, Astrophysical Journal Letters 896 (2020) 1, art. no. L13.

150. Standard versus non-standard CP phases in neutrino oscillation in matter with non-unitarity, Martinez-Soler, I., Minakata, H. Progress of Theoretical and Experimental Physics 6 (2020) 063B01.

151. Vacuum decay in the Standard Model: analytical results with running and gravity, Espinosa, J.R. Journal of Cosmology and Astroparticle Physics 6 (2020) 052.

152. On the supersymmetric solutions of the Heterotic Superstring effective action, Fontanella, A., Ortín, T. Journal of High Energy Physics 6 (2020) 106.

153. Jet tagging made easy, Aguilar-Saavedra, J.A., Zaldívar, B. European Physical Journal C 80 (2020) 6, art. no. 530.

154. Discrete symmetries, weak coupling conjecture and scale separation in AdS vacua, Buratti, G., Calderón, J., Mininno, A., Uranga, A.M. Journal of High Energy Physics 6 (2020) 83.

155. Primordial black holes confront LIGO/Virgo data: Current situation, De Luca, V., Franciolini, G., Pani, P., Riotto, A. Journal of Cosmology and Astroparticle Physics 6 (2020) 044.

156. Detuning primordial black hole dark matter with early matter domination and axion monodromy, Ballesteros, G., Rey, J., Rompineve, F. Journal of Cosmology and Astroparticle Physics 6 (2020) 014.

157. Curvature perturbations from stochastic particle production during inflation, Garcia, M.A.G., Amin, M.A., Green, D. Journal of Cosmology and Astroparticle Physics 6 (2020) 039.

158. Effective theory of superconductivity in strongly coupled amorphous materials, Baggioli, M., Setty, C., Zaccone, A. Physical Review B 101 (2020) 21.

159. Search for dijet resonances in events with an isolated charged lepton using sqrt(s) = 13 TeV proton-proton collision data collected by the ATLAS detector, The ATLAS collaboration, including Aguilar-Saavedra, J.A. Journal of High Energy Physics 6 (2020) 151.

160. STRIDES: a 3.9 per cent measurement of the Hubble constant from the strong lens system DES J0408-5354, DES collaboration including. Ávila, S., J., García-Bellido, Monthly Notices of the Royal Astronomical Society 494 (2020) 4, pp. 6072-6102.

161. Quantum singular value decomposer, Bravo-Prieto, C., García-Martín, D., Latorre, J.I., Physical Review A 101 (2020) 6, art. no. 062310.

162. Theoretical uncertainties in the MSSM Higgs boson mass calculation, Bahl, H., Heinemeyer, S., Hollik, W., Weiglein, G. European Physical Journal C 80 (2020) 6, art. no. 497.

163. The mystery of photometric twins DES17X1boj and DES16E2bjy, DES collaboration including. Ávila, S., J., García-Bellido, Monthly Notices of the Royal Astronomical Society 494 (2020) 4, pp. 5576-5589.

164. Model of metastable eev dark matter, Dudas, E., Heurtier, L., Mambrini, Y., Olive, K.A., Pierre, M. Physical Review D 101 (2020) 11, art. no. 115029.

165. Dark photon dark matter in the presence of inhomogeneous structure, Witte, S.J., Rosauro-Alcaraz, S., McDermott, S.D., Poulin, V. Journal of High Energy Physics 6 (2020) 132.

166. Updates and New Results in Models with Reduced Couplings, Heinemeyer, S., Mondragón, M., Patellis, G., Tracas, N., Zoupanos, G. Fortschritte der Physik 68 (2020) 6, art. no. 2000028.

167. Sextic tensor field theories in rank 3 and 5, Benedetti, D., Delporte, N., Harribey, S., Sinha, R. Journal of High Energy Physics 6 (2020) 65.

168. A semi-infinite matrix analysis of the BFKL equation, de León, N.B., Chachamis, G., Romagnoni, A., SabioÂ Vera, A. European Physical Journal C 80 (2020) 6, art. no. 549.

169. Search for squarks and gluinos in final states with same-sign leptons and jets using 139 fb^-1 of data collected with the ATLAS detector, The ATLAS collaboration, including Aguilar-Saavedra, J.A. Journal of High Energy Physics 6 (2020) 46.

170. Piercing the rainbow state: Entanglement on an inhomogeneous spin chain with a defect, De Buruaga, N.S.S., Santalla, S.N., Rodríguez-Laguna, J., Sierra, G. Physical Review B 101 (2020) 20, art. no. 205121.

171. Entanglement as geometry and flow, Singha Roy, S., Santalla, S.N., Rodríguez-Laguna, J., Sierra, G. Physical Review B 101 (2020) 19, art. no. 195134.

172. Top quark mass measurement in radiative events at electron-positron colliders, Boronat, M., Fullana, E., Fuster, J., Gomis, P., Hoang, A.H., Widl, A., Mateu, V., Vos, M. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 804 (2020) 135353.

173. Multiphoton signals of a (96 GeV?) stealth boson, Aguilar-Saavedra, J.A., Joaquim, F.R. European Physical Journal C 80 (2020) 5, art. no. 403.

174. No go for a flow, Carta, F., Mininno, A. Journal of High Energy Physics 5 (2020) 108.

175. Limits on assigning a shape to a nucleus, Poves, A., Nowacki, F., Alhassid, Y. Physical Review C, 101 (2020) 5, art. no. 054307.

176. Holographic topological semimetals, Landsteiner, K., Liu, Y., Sun, Y.-W. Science China: Physics, Mechanics and Astronomy 63 (2020) 5, art. no. 250001.

177. Constraining Axion Inflation with Gravitational Waves across 29 Decades in Frequency, Adshead, P., Giblin, J.T., Jr., Pieroni, M., Weiner, Z.J. Physical Review Letters 124 (2020) 17, art. no. 171301.

178. Measuring the net circular polarization of the stochastic gravitational wave background with interferometers, Domcke, V., García-Bellido, J., Peloso, M., Pieroni, M., Ricciardone, A., Sorbo, L., Tasinato, G. Journal of Cosmology and Astroparticle Physics 5 (2020) 028.

179. Global bounds on the Type-III Seesaw, Biggio, C., Fernandez-Martinez, E., Filaci, M., Hernandez-Garcia, J., Lopez-Pavon, J. Journal of High Energy Physics 5 (2020) 22.

180. Proton decay: flipped vs. unflipped SU(5), Ellis, J., Garcia, M.A.G., Nagata, N., Nanopoulos, D.V., Olive, K.A. Journal of High Energy Physics 5 (2020) 21.

181. Observation and confirmation of nine strong-lensing systems in Dark Energy Survey Year 1 data, DES collaboration including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 494 (2020) 1, pp. 1308-1322.

182. The Curious Case of PHL 293B: A Long-lived Transient in a Metal-poor Blue Compact Dwarf Galaxy, Burke, C.J., et al including Ávila, S., J., García-Bellido, J. Astrophysical Journal Letters 894 (2020) 1, art. no. L5.

183. Scale invariant solids, Baggioli, M., Castillo, V.C., Pujolas, O. Physical Review D101(2020)8, art.. 086005.

184. Constraining axion inflation with gravitational waves from preheating, Adshead, P., Giblin, J.T., Jr., Pieroni, M., Weiner, Z.J. Physical Review D 101 (2020) 8, art. no. 083534.

185. Monte Carlo control loops for cosmic shear cosmology with DES Year 1 data, DES collaboration including Ávila, S., García-Bellido, J. Physical Review D 101 (2020) 8, art. no. 082003

186. Milky Way Satellite Census. I. The Observational Selection Function for Milky Way Satellites in des Y3 and Pan-STARRS DR1, DES collaboration including Ávila, S., García-Bellido, J. Astrophysical Journal 893 (2020) 1, art. no. 47.

187. Milky Way Satellite Census. II. Galaxy-Halo Connection Constraints including the Impact of the Large Magellanic Cloud, DES collaboration including Ávila, S., García-Bellido, J. Astrophysical Journal 893 (2020) 1, art. no. 48.

188. Entropic locking of Action Complexity at cosmological singularities, Barbón, J.L.F., Martín-García, J. Journal of High Energy Physics 4 (2020) 11.

189. Instanton corrections and Emergent Strings, Baume, F., Marchesano, F., Wiesner, M. Journal of High Energy Physics 4 (2020) 174.

190. Transverse collective modes in interacting holographic plasmas, Baggioli, M., Gran, U., Tornsö, M. Journal of High Energy Physics 4 (2020) 106.

191. Strong lensing time delay constraints on dark energy: a forecast, Shiralilou, B., Martinelli, M., Papadomanolakis, G., Peirone, S., Renzi, F., Silvestri, A. Journal of Cosmology and Astroparticle Physics 4 (2020) 057.

192. High-energy cosmic ray production in X-ray binary jets, Cooper, A.J., Gaggero, D., Markoff, S., Zhang, S. Monthly Notices of the Royal Astronomical Society 493 (2020) 3, pp. 3212-3222.

193. Confronting the neutralino and chargino sector of the NMSSM with the multilepton searches at the LHC, Domingo, F., Kim, J.S., Lozano, V.M., MartÃ-n-Ramiro, P., De Austri, R.R. Physical Review D 101 (2020) 7, art. no. 075010.

194. Multilepton dark matter signals, Aguilar-Saavedra, J.A., Casas, J.A., Quilis, J., Ruiz de Austri, R. Journal of High Energy Physics 4 (2020) 69.

195. Identifying the Riemann zeros by periodically driving a single qubit, He, R., Ai, M.-Z., Cui, J.-M., Huang, Y.-F., Han, Y.-J., Li, C.-F., Tu, T., Creffield, C.E., Sierra, G., Guo, G.-C. Physical Review A 101 (2020) 4, art. no. 043402,.

196. Impact of Higgs physics on the parameter space of the mu nu SSM, Kpatcha, E., López-Fogliani, D.E., Muñoz, C., de Austri, R.R. European Physical Journal C 80 (2020) 4, art. no. 336.

197. Partition functions on slightly squashed spheres and flux parameters, Bueno, P., Cano, P.A., Hennigar, R.A., Penas, V.A., Ruipérez, A. Journal of High Energy Physics 4 (2020) 123.

198. Measuring the tangle of three-qubit states, Pérez-Salinas, A., García-Martín, D., Bravo-Prieto, C., Latorre, J.I. Entropy 22 (2020) 4, art. no. 436.

199. Precision mass measurements of Fe 67 and Co 69,70: Nuclear structure toward N=40 and impact on r -process reaction rates, Canete, L. Et al including Poves, A. Physical Review C 101 (2020) 4, art. no. 041304.

200. Precision calculations in the MSSM Higgs-boson sector with FeynHiggs 2.14, Bahl, H., Hahn, T., Heinemeyer, S., Hollik, W., Passehr, S., Rzehak, H., Weiglein, G. Computer Physics Communications 249 (2020) 107099.

201. Optimizing automatic morphological classification of galaxies with machine learning and deep learning using Dark Energy Survey imaging, Cheng et al including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 493 (2020) 3, pp. 4209-4228.

202. Dynamical Classification of Trans-Neptunian Objects Detected by the Dark Energy Survey, Khain, T., et al including Ávila, S., García-Bellido, J. Astronomical Journal, 159 (2020) 4, art. no. 133.

203. Birds of a Feather? Magellan/IMACS Spectroscopy of the Ultra-faint Satellites Grus II, Tucana IV, and Tucana V, Simon, J.D., et al including Ávila, S., García-Bellido, J. Astrophysical Journal, 892 (2020) 2, art. no. 137.

204. Stellar mass as a galaxy cluster mass proxy: Application to the Dark Energy Survey redMaPPer clusters, Palmese, A., et al including Ávila, S., García-Bellido, J. Monthly Notices of the Royal Astronomical Society 493 (2020) 4, pp. 4591-4606.

205. Z boson production in Pb+Pb collisions at âˆšSnn = 5.02 TeV measured by the ATLAS experiment, The ATLAS Collaboration, including Aguilar-Saavedra, J.A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 802 (2020) 135262.

206. Complexity and time, Gómez, C. Physical Review D 101 (2020) 6, art. no. 065016.

207. COMET Phase-I technical design report, Abramishvili, R., et al including Ota, T. Progress of Theoretical and Experimental Physics 3 (2020) 033C01.

208. Detection of Cross-Correlation between Gravitational Lensing and gamma Rays, Ammazzalorso, S., et al including Ávila, S., García-Bellido, J. Physical Review Letters 124 (2020) 10, art. no. 101102.

209. Geometric inflation, Arciniega, G., Bueno, P., Cano, P.A., Edelstein, J.D., Hennigar, R.A., Jaime, L.G. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 802 (2020) 135242.

210. The small black hole illusion, Cano, P.A., Ramírez, P.F., Ruipérez, A. Journal of High Energy Physics 3 (2020) 115.

211. Constraints to dark matter annihilation from high-latitude HAWC unidentified sources, Coronado-Blázquez, J., Sánchez-Conde, M.A. Galaxies 8 (2020) 1, art. no. 5.

212. Precise determination of alpha_s from relativistic quarkonium sum rules, Boito, D., Mateu, V. Journal of High Energy Physics 3 (2020) 94.

213. Probing dark matter freeze-in with long-lived particle signatures: MATHUSLA, HL-LHC and FCC-hh, No, J.M., Tunney, P., Zaldivar, B. Journal of High Energy Physics 3 (2020) 22.

214. NLO massive event-shape differential and cumulative distributions, Lepenik, C., Mateu, V. Journal of High Energy Physics 3 (2020) 24.

215. A note on unimodular N=1, d=4 AdS supergravity, Anero, J., Martin, C.P., Santos-Garcia, R. Journal of Cosmology and Astroparticle Physics 3 (2020) 006.

216. Universal properties of Kaluza-Klein gravitons, Dimmitt, K., Larios, G., Ntokos, P., Varela, O. Journal of High Energy Physics 3 (2020) 39.

217. Physics potential of the ESS nu SB, Blennow, M., Fernandez-Martinez, E., Ota, T., Rosauro-Alcaraz, S. European Physical Journal C 80 3 (2020) 190.

218. On scale separation in type II AdS flux vacua, Font, A., Herráez, A., Ibáñez, L.E. Journal of High Energy Physics 3 (2020) 13.

219. Sensitivity to light sterile neutrinos at ESSnuSB, Ghosh, M., Ohlsson, T., Rosauro-Alcaraz, S. Journal of High Energy Physics 3 (2020) 26.

220. The exponential tail of inflationary fluctuations: Consequences for primordial black holes, Ezquiaga, J.M., García-Bellido, J., Vennin, V. Journal of Cosmology and Astroparticle Physics 3 (2020) 029.

221. Flowing to N = 3 Chern-Simons-matter theory, Guarino, A., Tarrío, J., Varela, O. Journal of High Energy Physics 3 (2020) 100.

222. The bias of dark matter tracers: Assessing the accuracy of mapping techniques, Pellejero-Ibáñez, M., Balaguera-Antolínez, A., Kitaura, F.-S., Angulo, R.E., Yepes, G., Chuang, C.-H., Reyes-Peraza, G., Autefage, M., Vakili, M., Zhao, C. Monthly Notices of the Royal Astronomical Society 493 (2020) 1, pp. 586-593.

223. Measurement of azimuthal anisotropy of muons from charm and bottom hadrons in pp collisions at âˆšs = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, Physical Review Letters 124 (2020) 8, art. no. 082301.

224. Science case for the Einstein telescope, Maggiore, M., et al including, García-Bellido, Journal of Cosmology and Astroparticle Physics 3 (2020) 050.

225. Shell structure of the neutron-rich isotopes Co 69,71,73 Lokotko, T., et al including Poves, A., Physical Review C 101 (2020) 3, art. no. 034314.

226. Constraints on dark photons and axionlike particles from the SuperCDMS Soudan experiment, SuperCDMS Collaboration including Cerdeño, D.G. Physical Review D 101 (2020) 5, art. no. 052008.

227. Trans-Neptunian Objects Found in the First Four Years of the Dark Energy Survey, Bernardinelli, P.H., et al including Ávila, S., García-Bellido, J. Astrophysical Journal, Supplement Series 247 (2020) 1, art. no. 32.

228. The SPTPoL extended cluster survey, Bleem, L.E., et al including Ávila, S., García-Bellido, J. Astrophysical Journal, Supplement Series 247 (2020) 1, art. no. 25.

229. Measurement of the Z(->\ell^+\ell^-)gamma production cross-section in pp collisions at âˆšs = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 3 (2020) 54.

230. Fermi Large Area Telescope Fourth Source Catalog, Abdollahi, S., et al including Coronado-Blázquez, J. Astrophysical Journal, Supplement Series 247 (2020) 1, art. no. 33.

231. Measurement of isolated-photon plus two-jet production in pp collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 3 (2020) 179.

232. Search for new resonances in mass distributions of jet pairs using 139 fb^-1 of pp collisions at sqrt(s) = 13 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 3 (2020) 145.

233. Nonlinear Oscillatory Shear Tests in Viscoelastic Holography, Baggioli, M., Grieninger, S., Soltanpanahi, H. Physical Review Letters 124 (2020) 8, art. no. 081601.

234. Detecting gravitational waves from cosmological phase transitions with LISA: An update, Caprini, C., Chala, M., Dorsch, G.C., Hindmarsh, M., Huber, S.J., Konstandin, T., Kozaczuk, J., Nardini, G., No, J.M., Rummukainen, K., Schwaller, P., Servant, G., Tranberg, A., Weir, D.J. Journal of Cosmology and Astroparticle Physics 3 (2020) 024.

235. Wave-particle duality employing quantum coherence in superposition with non-orthogonal pointers, Das, S., Mukhopadhyay, C., Roy, S.S., Bhattacharya, S., Sen(de), A., Sen, U. Journal of Physics A: Mathematical and Theoretical 53 (2020) 11, art. no. 115301.

236. Entanglement entropy of primordial black holes after inflation, Espinosa-Portalés, L., García-Bellido, J. Physical Review D 101 (2020) 4, art. no. 043514.

237. Extremal rotating black holes in Einsteinian cubic gravity, Cano, P.A., Pereñíguez, D. Physical Review D 101 (2020) 4, art. no. 044016.

238. Generalized blind spots for dark matter direct detection in the 2HDM, Cabrera, M.E., Casas, J.A., Delgado, A., Robles, S. Journal of High Energy Physics 2 (2020) 166.

239. Features in cosmic-ray lepton data unveil the properties of nearby cosmic accelerators, Fornieri, O., Gaggero, D., Grasso, D. Journal of Cosmology and Astroparticle Physics 2 (2020) 009.

240. Nonresonant Searches for Axionlike Particles at the LHC, Gavela, M.B., No, J.M., Sanz, V., De Trocóniz, J.F. Physical Review Letters 124 (2020) 5, art. no. 051802.

241. On the extremality bound of stringy black holes, Cano, P.A., Ortín, T., Ramírez, P.F. Journal of High Energy Physics 2 (2020) 175.

242. Conformal invariance versus Weyl invariance, Alvarez, E., Anero, J., Santos-Garcia, R. European Physical Journal C 80 (2020) 2, art. no. 95.

243. alpha′ corrections of Reissner-Nordstrom black holes, Cano, P.A., Chimento, S., Linares, R., Ortín, T., RamÃ-rez, P.F. Journal of High Energy Physics 2 (2020) 31.

244. A testable hidden-sector model for Dark Matter and neutrino masses, Gehrlein, J., Pierre, M. Journal of High Energy Physics 2 (2020), art. no. 68.

245. Trends of information backflow in disordered spin chains, Singha Roy, S., Mishra, U., Rakshit, D.EPL 129 (2020) 3, art. no. 30005.

246. Enlarging the scope of resonant di-Higgs searches: hunting for Higgs-to-Higgs cascades in 4b final states at the LHC and future colliders, Barducci, D., Mimasu, K., No, J.M., Vernieri, C., Zurita, J. Journal of High Energy Physics 2 (2020) 2.

247. Improved global fit to Non-Standard neutrino Interactions using COHERENT energy and timing data, Coloma, P., Esteban, I., Gonzalez-Garcia, M.C., Maltoni, M. J. High Energy Physics, 2 (2020) 23.

248. Searches for lepton-flavour-violating decays of the Higgs boson in s=13 TeV pp collisions with the ATLAS detector, The ATLAS Collaboration including Aguilar-Saavedra, J. A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 800 (2020) 135069.

249. The PAU survey: Background light estimation with deep learning techniques, PAU collaboration, including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 491 (2020) 4, 5392-5405.

250. FLAG Review 2019: Flavour Lattice Averaging Group (FLAG), Aoki, S., et al including Herdoiza, G., Pena, C. European Physical Journal C 80 (2020) 2, art. no. 113, .

251. Flavor Techniques for LFV Processes: Higgs Decays in a General Seesaw Model, Marcano, X., Morales, R.A. Frontiers in Physics 7 (2020) 228.

252. MeV-GeV gamma-ray telescopes probing axino LSP/gravitino NLSP as dark matter in the mu nu SSM, Gómez-Vargas, G.A., López-Fogliani, D.E., Muñoz, C., Perez, A.D. Journal of Cosmology and Astroparticle Physics 1 (2020) 058.

253. Superstring-inspired particle cosmology: Inflation, neutrino masses, leptogenesis, dark matter & the SUSY scale, Ellis, J., Garcia, M.A.G., Nagata, N., Nanopoulos, D.V., Olive, K.A. Journal of Cosmology and Astroparticle Physics 1 (2020) 035.

254. Instability of Higgs vacuum via string cloud, Koga, I., Kuroyanagi, S., Ookouchi, Y. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 800 (2020) 135093.

255. Shell evolution of N=40 isotones towards 60Ca: First spectroscopy of 62Ti, Cortés, M.L., et al including Poves, A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 800 (2020) 135071.

256. Measurement of differential cross sections for single diffractive dissociation in sqrt(s) = 8 TeV pp collisions using the ATLAS ALFA spectrometer, The ATLAS collaboration including Aguilar-Saavedra, J.A., Journal of High Energy Physics 2 (2020), art. no. 42.

257. Combination of searches for Higgs boson pairs in pp collisions at s=13TeV with the ATLAS detector, The ATLAS Collaboration including Aguilar-Saavedra, J.A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 800 (2020) 135103.

258. Search for flavour-changing neutral currents in processes with one top quark and a photon using 81 fbâ˜'1 of pp collisions at s=13TeV with the ATLAS experiment, The ATLAS Collaboration including Aguilar-Saavedra, J. A. Physics Letters, Section B: Nuclear, Elementary Particle and High-Energy Physics 800 (2020) 135082.

259. Electroweak and QCD corrections to Z and W pole observables in the standard model EFT, Dawson, S., Giardino, P.P. Physical Review D 101 (2020) 1, art. no. 013001.

260. Combined measurements of Higgs boson production and decay using up to 80 fb-1 of proton-proton collision data at sqrt(s) =13 TeV collected with the ATLAS experiment, The ATLAS Collaboration including Aguilar-Saavedra, J. A. Physical Review D 101 (2020) 1, art. no. 012002.

261. Torsion and anomalies in the warped limit of Lifschitz theories, Copetti, C. Journal of High Energy Physics 1 (2020) 190.

262. New physics with boosted single top production at the LHC and future colliders, Aguilar-Saavedra, J.A., Mangano, M.L. European Physical Journal C 80 (2020) 1, art. no. 5.

263. Double logarithms in N =4 supergravity: weak gravity and Shapiro's time delay, Sabio Vera, A. Journal of High Energy Physics 1 (2020) 163.

264. Generalized) quasi-topological gravities at all orders, Bueno, P., Cano, P.A., Hennigar, R.A. Classical and Quantum Gravity 37 (2020) 1, art. no. 015002.

265. Off-shell unimodular N = 1, d = 4 supergravity, Anero, J., Martin, C.P., Santos-Garcia, R. Journal of High Energy Physics 1 (2020) 145.

266. Testable axion-like particles in the minimal linear Ïƒ model, Alonso-GonzÃ¡lez, J., Merlo, L., Pobbe, F., Rigolin, S., Sumensari, O. Nuclear Physics B 950 (2020) 114839.

267. A 96 GeV Higgs boson in the N2HDM, Biekötter, T., Chakraborti, M., Heinemeyer, S. European Physical Journal C 80 (2020) 1, art. no. 2.

268. Evaporating primordial black holes as varying dark energy, Nesseris, S., Sapone, D., Sypsas, S. Physics of the Dark Universe 27 (2020) 100413.

269. SKA-Phase 1 sensitivity to synchrotron radio emission from multi-TeV Dark Matter candidates, Cembranos, J.A.R., de la Cruz-Dombriz, Á., Gammaldi, V., Méndez-Isla, M. Physics of the Dark Universe 27 (2020) 100448.

270. Gapless and gapped holographic phonons, Amoretti, A., Areán, D., Goutéraux, B., Musso, D. Journal of High Energy Physics 1 (2020) 58.

271. The Completed SDSS-IV extended Baryon Oscillation Spectroscopic Survey: Measurement of the BAO and growth rate of structure of the luminous red galaxy sample from the anisotropic power spectrum between redshifts 0.6 and 1.0, Gil-Marín, H., et al including Ávila, S. Monthly Notices of the Royal Astronomical Society 498 (2020) 2, pp. 2492-2531.

272. LHC Dark Matter Working Group: Next-generation spin-0 dark matter models, Abe, T., et al including No, J.M. Physics of the Dark Universe 27 (2020) art. no. 100351.

273. The host galaxies of 106 rapidly evolving transients discovered by the Dark Energy Survey, Wiseman, P., et al including García-Bellido, J. Monthly Notices of the Royal Astronomical Society 498 (2020) 2, pp. 2575-2593.

274. Quasar Accretion Disk Sizes from Continuum Reverberation Mapping in the DES Standard-star Fields, Yu, Z., et al including Ávila, S., J., García-Bellido, J. Astrophysical Journal, Supplement Series 246 (2020) 1, art. no. 16.

275. Reinterpretation of LHC results for new physics: Status and recommendations after run 2, Abdallah, W., et al including Heinemeyer, S. SciPost Physics 9 (2020) 2, pp. 1-45.

276. Review of particle physics, Particle Data Group including Heinemeyer, S. Progress of Theoretical and Experimental Physics 8 (2020) pp. 1-2093.

277. Fluctuations of anisotropic flow in Pb+Pb collisions at sqrt(s)NN = 5.02 TeV with the ATLAS detector, The ATLAS collaboration including Aguilar-Saavedra, J.A. Journal of High Energy Physics 1 (2020) 51.

11

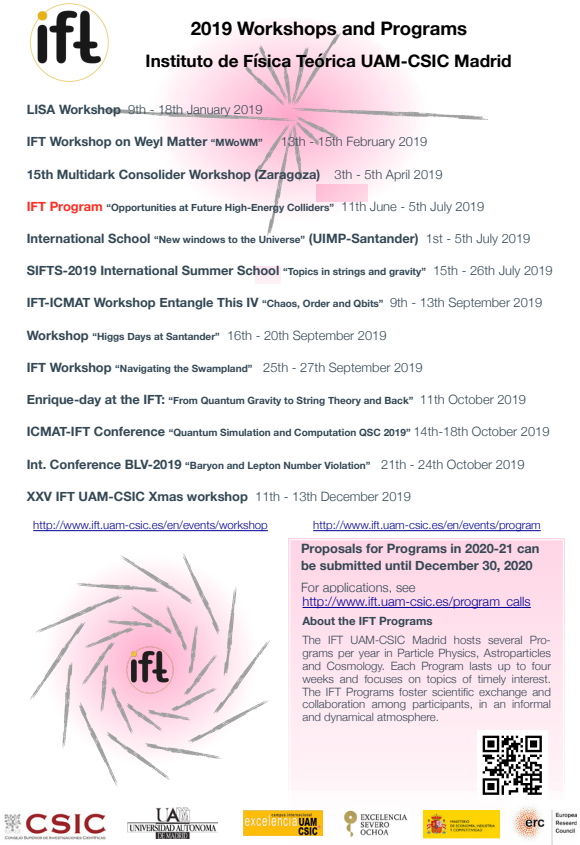
Programas, Congresos y Talleres
Programs, Workshops and Conferences

El Instituto de Física Teórica UAM/CSIC concede una gran importancia a la organización de reuniones científicas. Por un lado permiten a nuestros miembros discutir con los principales expertos mundiales los últimos avances en los distintos temas de investigación. A su vez, estas reuniones son un importante escaparate de nuestro Instituto y sus actividades. Por ello, el IFT organiza un número considerable de talleres y conferencias, así como programas extendidos en el marco del proyecto Severo Ochoa. Nos gustaría mencionar especialmente la conferencia anual denominada "Xmas Workshop" que ya va por su 26ª edición. Dicha conferencia es una de las actividades que llevó a cabo el instituto desde sus inicios y su celebración es simbólicamente como nuestro cumpleaños.

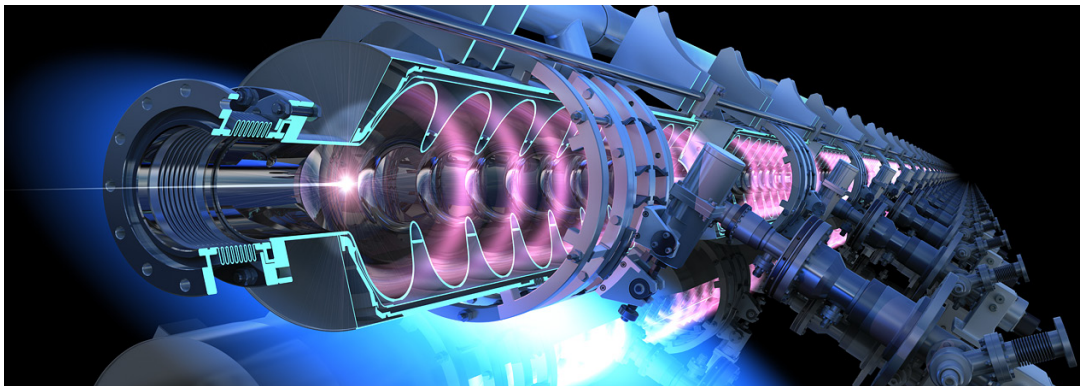
A continuación mostraremos aquellas reuniones científicas de carácter internacional organizadas por el IFT en 2019-2020. En 2020, varias de estas actividades se realizaron en modalidad online debido a la pandemia de COVID-19

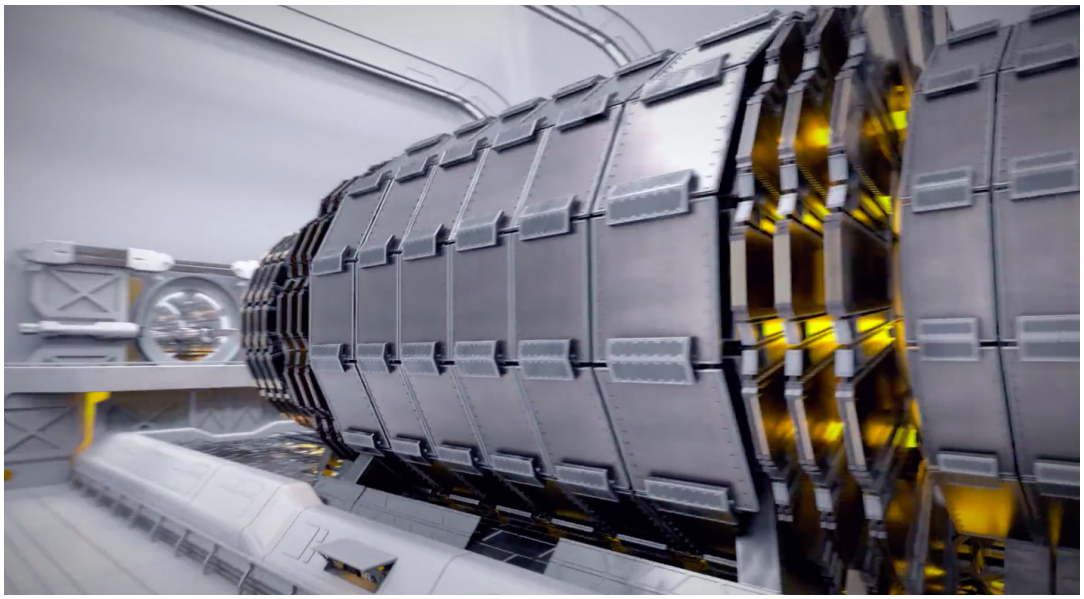
The Institute of Theoretical Physics UAM/CSIC pays special importance to the organization of scientific meetings. On one side, this allows our members to discuss with the leading world experts about the latest advances in the different lines of research. On the other hand, they enhance the visibility of our Institute and its activities. Hence the Institute organizes a substantial number of conferences, workshops, and also extended programs in the framework of the Severo Ochoa grant. We would like to emphasize the annual "X-mas workshop" conference, already at its 26th edition. This workshop is among the original seeds of our Institute, and its celebration symbolically signals its birthday.

In the following we display the relevant data for international meetings organized by the IFT in 2019-20. In 2020, several of these activities took place online, due to the COVID-19 pandemic.



Programas Extensos
Extended Programs





Opportunities at Future High Energy Colliders

11/06-5/07/2019

The quest to discover BSM physics is motivated by fundamental questions left unanswered by the Standard Model, including: Why is the mass of the Higgs boson so small compared to the Planck scale? What comprises the dark matter and what is the nature of its interactions? Why does the Universe contain more matter than anti-matter? What is responsible for the tiny but non-vanishing neutrino masses?

Finding answers to these and other open questions requires advances at the experimental and theoretical frontiers. In this context, there is still a large potential for new discoveries at the LHC. However, it is increasingly evident that at least next generation high energy collider may be needed in order to unravel the puzzles left unexplained by the Standard Model. A number of possibilities are under serious consideration, including the International Linear Collider (ILC), the Compact Linear Collider (CLIC), an energy upgrade of LHC (HE-LHC), the CERN Future Circular Collider as e+e- collider (FCC-ee) as pp collider (FCC-hh) and as ep collider (FCC-eh), the Circular Electron-Positron Collider/Super Proton-Proton Collider (CEPC/SppC).

Any of these machines would open new frontiers in precision or energy. The ILC, CLIC, FCC-ee, and CEPC would enable electron-positron collisions with higher energy and beam luminosities than have ever been achieved, while the FCC-hh, HE-LHC and SppC would do the same for proton-proton collisions. In addition, the FCC-eh would open new ground in electron-proton collisions.

Well-defined communities of theorists and experimentalists have coalesced around each effort, producing significant studies that elucidate the opportunities. What is less clear is the global view. Is there a need for more than one future collider? To what extent are the prospectives linear and circular e+e- colliders complementary? To what extent are they synergistic with the high luminosity LHC and the proposed future hadron colliders? How might the results from the high luminosity phase of the LHC affect the opportunities with these other future machines?

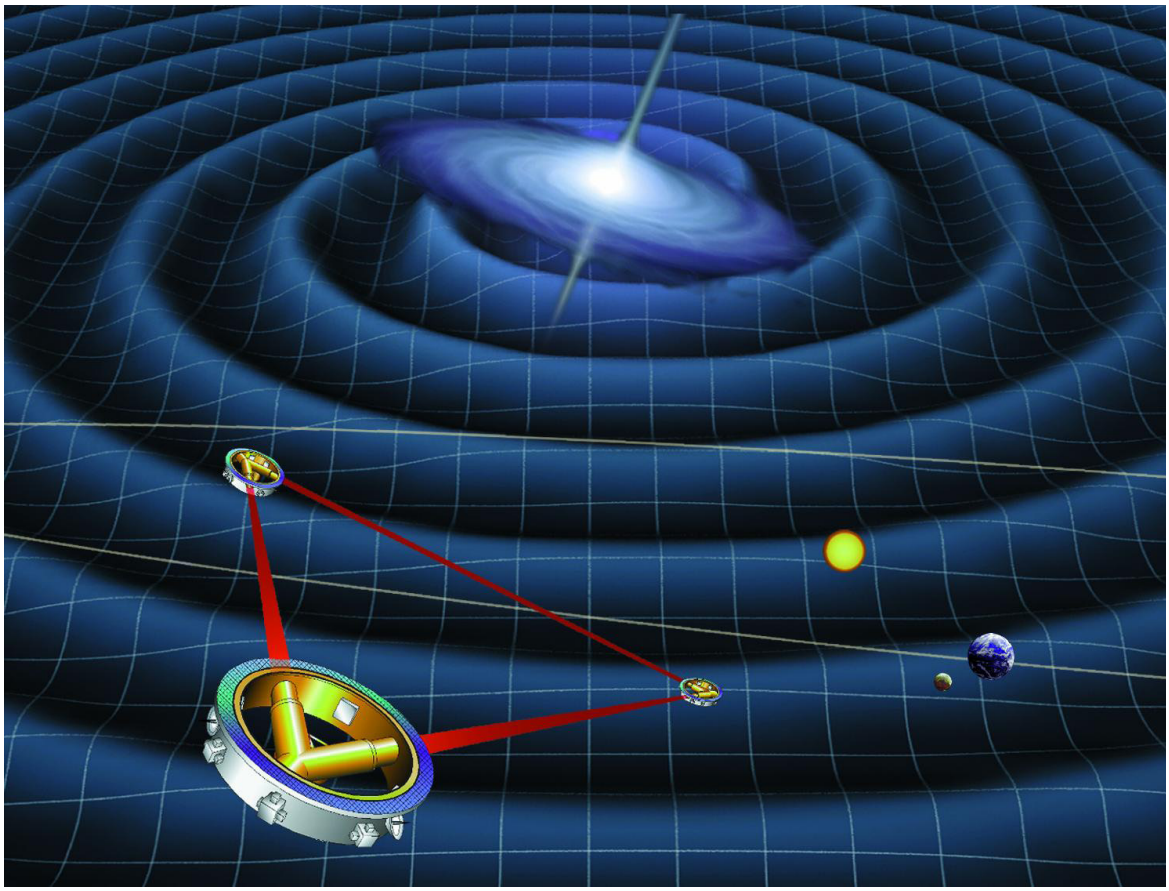
The workshop brought together key theorists and experimentalists to address these questions, aiming at a more coherent, global view of the opportunities and rationale for the next generation of high energy colliders.

Organizers: Sven Heinemeyer (IFT), Jenny List (DESY), Michael Ramsey-Musolf (U. of Massachusetts), Frank Simon (MPI Munich), Shufang Su (U. of Arizona).

51 participants

Webpage: https://workshops.ift.uam-csic.es/FC2019

Congresos y Talleres
Workshops and Conferences



Stochastic Background Data Analysis for LISA meeting

9-11/1/2019

LISA Cosmo-GW workshop

14-18/1/2019

The meeting "Stochastic Background Data Analysis for LISA meeting" took place from the 9th to 11th of January 2019 at the Institute of Theoretical Physics (IFT) in Madrid, Spain. It is hosted by the IFT Cosmology group.

The meeting aimed at forming a collaborative team of LISA members wishing to contribute to the stochastic background data analysis for LISA. The meeting primarily focused on the Radler data release (i.e. the last data produced by the LDC). Discussions about novel ideas suitable for future data challenges played a central role, and. all emerging ideas were shared with the team.

The meeting was followed by the 6th Cosmology WG workshop on January 14-18th 2019.

20 participants

Organizers: Robert Caldwell (Dartmouth College), Chiara Caprini (Laboratoire APC, Paris), Jose María Ezquiaga (IFT), Juan Garcia-Bellido (IFT), Germano Nardini (IFT), Savvas Nesseris (IFT), Jose Miguel No (IFT), Mauro Pieroni (IFT), Monica Vergel (IFT).

Webpage: https://workshops.ift.uam-csic.es/lisastochastic2019/

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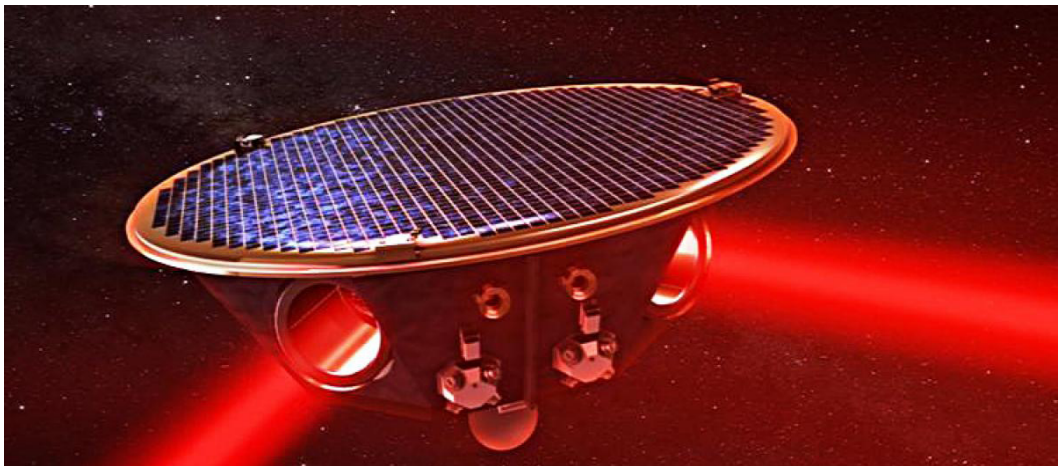


Memoria Anual
Annual Report

2019-2020

Workshop on Weyl Metals

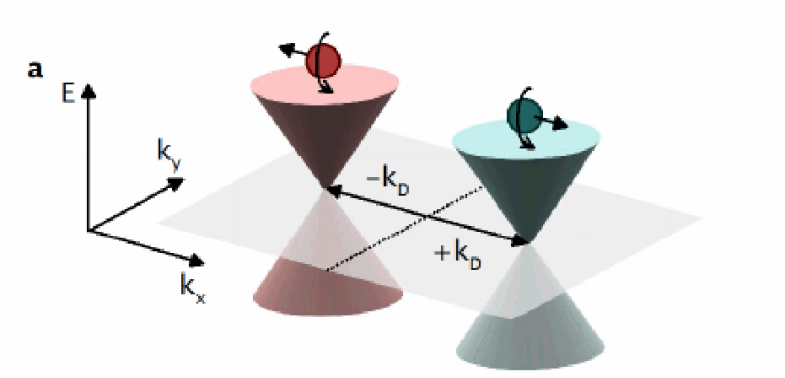
11-15/02/2019

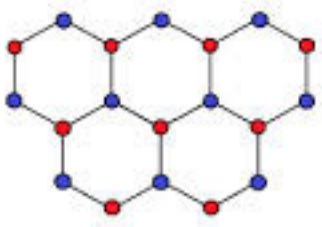
Advanced materials can have Weyl fermions as their effective electronic excitations. There exists a plethora of new transport phenomena that can be derived with quantum field theory methods and are based in the theory of chiral anomalies. First ideas for applications of these new transport phenomena are being developed. The workshop at the IFT-Madrid gathered some of the world leading experts to stimulate new developments and discuss new ideas for applications.

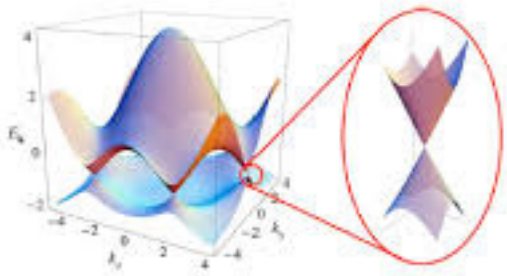
Organizers: Maria Vozmediano (ICMM), Karl Landsteiner (IFT), Alberto Cortijo (ICMM), Monica Vergel (IFT).

25 participants

Webpage: https://workshops.ift.uam-csic.es/mwwm/







15th MultiDark Consolider Workshop

Zaragoza, 3th-5th April 2019

MultiDark
Multimessenger Approach for Dark Matter Detection

Universidad Zaragoza
1542

Consolider

GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA Y COMPETITIVIDAD

PROGRAMA INGENIO 2010

Consolider Network

Multimessenger Approach for Dark Matter Detection - MultiDark

More info:

Local Organizers: mlsarsa@unizar.es, edgarcia@unizar.es, mariam@unizar.es
MultiDark Office Manager: susana.hernandez@uam.es
http://www.multidark.es

Participant Institutions:

UAM UNIVERSIDAD AUTÓNOMA DE MADRID · ift · CSIC · IFCA Instituto de Física de Cantabria · IFIC · Universidad de Huelva · Universidad de Cádiz · Universidad de Salamanca · Universidad de Murcia · IAA · IAC · IFAE · Universidad Politécnica de Valencia · Universidad de Alcalá · USC · UIB Universitat de les Illes Balears · Universidad de Murcia · CETA-CIEMAT

15th MultiDark Consolider Workshop

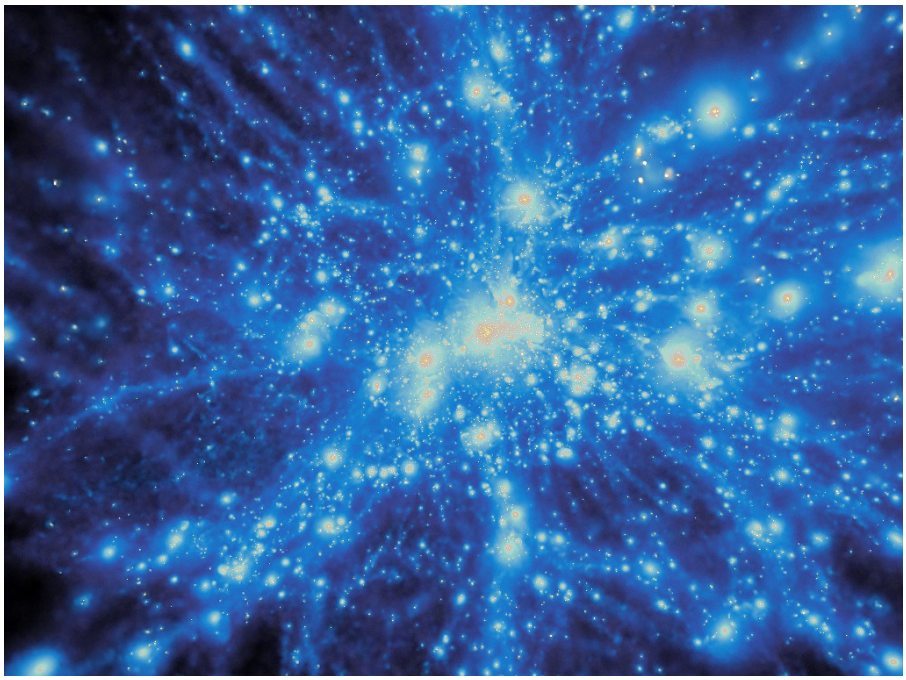
3-5/4/2019, Zaragoza

Up to now science has failed to identify what makes up to 85% of the matter of the Universe. Elucidating the nature of dark matter constitutes a key challenge in modern physics. MultiDark is a Consolider Network supported by the Spanish Research Agency, in which theoretical and experimental groups with particle physicists, astrophysicists and cosmologists from 18 Spanish universities and research institutes, experts in astroparticle physics, join efforts to take up this task from a multidisciplinary perspective.

56 participants

Organizers: MultiDark PGB, María Luisa Sarsa (UZ), María Martínez (UZ), Eduardo García (UZ), Susana Hernández (IFT)

Webpage: https://workshops.ift.uam-csic.es/multidark15




3rd Red LHC Workshop
06 - 08 May 2019 @ UAM (Madrid)
Red LHC España
1968 2018
Cincuenta Aniversario
UAM Universidad Autónoma de Madrid
GOBIERNO DE ESPAÑA
MINISTERIO DE ECONOMÍA, INDUSTRIA Y COMPETITIVIDAD
https://indico.cern.ch/e/redlhc3
Local organizers:
J. A. Aguilar-Saavedra
S. Heinemeyer
J. Terron

3rd RED LHC workshop

6-8/05/2019

This is a workshop devoted to promoting the interaction and discussion between theorists and experimentalists, covering topics such as Higgs, top, W/Z, dark matter and multi-leptonic signals.

68 participants

Organizers: J.A. Aguilar-Saavedra (U. Granada), S. Heinemeyer (IFT), J. Terrón (UAM)


ENTANGLE THIS IV:
CHAOS, ORDER AND QUBITS
Madrid, 9-13
September 2019
Speakers:
V. Balasubramanian
M.C. Bañuls
P. Calabrese
J. Dubail
J. Eisert
G. Evenbly
H. Gharibyan
C. Lancien
A. Ludwig
M. Rigol
K. Papadodimas
R. Sinha
C. Sünderhauf
L. Tagliacozzo
T. Takayanagi
E. Tonni
Organizers:
J. Barbon
E. Lopez
D. Perez-Garcia
G. Sierra
https://www.icmat.es/RT/2019/QIT/entangle.php
ift
ICMAT
INSTITUTO DE CIENCIAS MATEMÁTICAS
QIT
MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
EXCELENCIA SEVERO OCHOA
European Commission
Horizon 2020
European Union funding for Research & Innovation
erc
European Research Council
UAM
Universidad Autónoma de Madrid
CSIC
Consejo Superior de Investigaciones Científicas
Comunidad de Madrid

Entangle This IV: Chaos, Order and Qubits

9-14/9/2019

The fourth edition of the "Entangle This" series took place at IFT & ICMAT from September 9 to September 14, 2019. We aimed at putting together a group of international experts working at the interface between quantum information theory, condensed matter physics, quantum field theory and gravity, to exchange ideas and results in an informal atmosphere.

Webpage: https://www.icmat.es/RT/2019/QIT/entangle.php


Higgs Days at Santander 2019
Theory meets Experiment
16.-20. September
Contact: Sven.Heinemeyer@cern.ch
Local: Alicia.Calderon@cern.ch
Gervasio.Gomez@cern.ch
http://hdays.csic.es

The Higgs Days at Santander 2019

16-20/09/2019

The workshop centered on avenues to understand, discuss, solve problems concerning Higgs boson searches and (precision) measurements at the LHC and future (ILC, ...) colliders. The focus was on the Higgs sector of the SM, the 2HDM and the MSSM and similar extensions.
For a successful Higgs boson search theory and experiment have to work hand in hand. This workshop facilitated the interaction between experimental and theoretical Higgs physicists. The program consisted of two parts: discussions of the results of the big experiments, as well as shorter theory presentations relevant to the subject. About half of the time was reserved for discussions.

43 participants

Organizers: Alicia Calderón (IFCA), Gervasio.Gomez (IFCA), Sven Heinemeyer (IFT),


NAVIGATING THE SWAMPLAND
IFT-MADRID, 25-27 SEPTEMBER 2019

Navigating the swampland

25-27/9/2019

The Swampland program gives general constraints on effective theories to be compatible with quantum gravity, which defines the Landscape of consistent theories, and is quickly gaining command of the fundamental understanding of open questions in particle physics and cosmology, ranging from the hierarchy of fundamental scales in nature, to the origin and final fate of the universe.

Current research surfs over several powerful conjectures, whose riptide deposits valuable implications on the structure of effective theories, their spectrum of particles, their moduli spaces and potentials. Time is ripe to navigate the swampland, collecting these results and conjectures, and weaving them up to unveil fundamental structures in quantum gravitational theories. This workshop gathered the leading experts in the field to review our knowledge on the Swampland extension, the underlying related fundamental questions within quantum gravity and string theory as well as possible constraints for particle physics and cosmology.

96 participants

Organizers: Luis Ibáñez (IFT), Fernando Marchesano (IFT), Angel Uranga (IFT), Mónica Vergel (IFT)

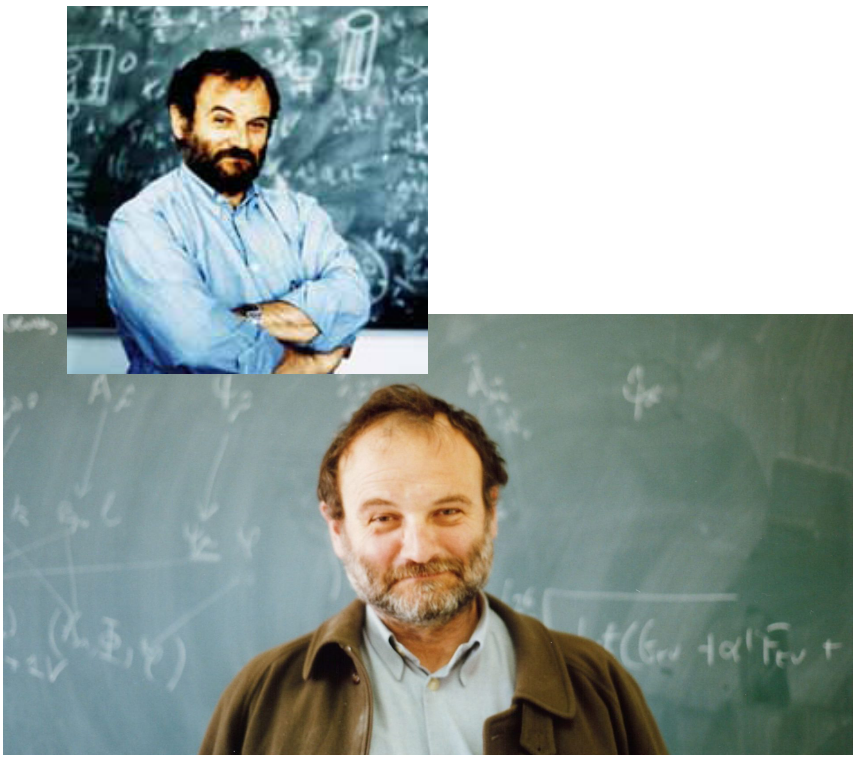
Webpage: https://workshops.ift.uam-csic.es/navigating

From Quantum Gravity to String Theory and back
A Meeting In Celebration Of Enrique Alvarez's 70th Birthday –
11/10/2019

A Meeting In Celebration Of Enrique Alvarez's 70th Birthday –

Organizers: José L. F. Barbón (IFT), Mario Herrero (SISSA), Yolanda Lozano (Oviedo U.), Tomás Ortín (IFT), Mónica Vergel (IFT)

https://projects.ift.uam-csic.es/Eday/




Quantum Simulation & Computation
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Program
Participants
Registration
Venue
Code of Conduct
Contact
QSC 2019
Quantum Simulation & Computation
14-18 October 2019, Madrid, Spain

Quantum Simulation and Computation

14-18/10/2019

The Quantum Simulation and Computation 2019 was the seventh iteration of a conference series that started in Benasque in 2011. The conference dealt with the short, mid- and long-term goals and applications of quantum simulators and quantum computers, with a strong focus on current and upcoming technologies and state-of-the-art algorithmic developments. Important questions that motivated the conference are

- The utility of NISQ simulators and computers for short-term practical applications, both in fundamental science and industry.
- The implementation and scalability of simulators and computers in different quantum platforms: cold atoms, trapped ions, superconducting circuits, quantum photonics, quantum dots..
- Advances in quantum software, from new algorithms with provable quantum advantages, to quantum-inspired classical methods.

We discussed these and other topics together with leading figures in experiments and theory, who showcased the state-of-the-art in the field and provided us with an outlook for the near- and long-term future.

59 participants

Organizers: David Pérez-García (ICMAT & UCM), Juan José García Ripoll (IFF-CSIC), Enrique Rico (UPV-EHU & Ikerbasque), Germán Sierra (IFT)

Webpage: https://qsc2019.hbar.es/home


EXCELENCIA SEVERO OCHOA
Cincuenta Aniversario
ift Instituto de Física Teórica UAM-CSIC
BNV 2019
2019 International Workshop on
Baryon and Lepton Number Violation
21-24 October 2019, Madrid, IFT
International Organizing Committee
A. Abada
B. Gavela (co-chair)
L. Baudis
T. Hambye
R. H. Bernstein
K. Heeger
M. Carena
L. Merlo
V. Cirigliano
A. Nelson *
E. Fernandez-Martinez
J. M. No
P. Fileviez Pérez (co-chair)
S. Pascoli
Conveners
K. Abazajian
A. Long
S. Davidson
D. McKeen
P. Fox
V. Sanz
E. Halkiadakis
P. Serpico
J. Heeck
M. Sorel
O. Igonkina *
A. Teixeira
G. Karagiorgi
D. Teresi
Junior Organizing Committee
J. Alonso
F. Arias
J. Bonilla
R. Houtz
C. Murgui
P. Quilez
S. Rosauro
Administrative support
R. Bello
C. Rubiera
M. Vergel

Baryon and Lepton Number Violation (BLV2019)

21-24/10/2019

The 2019 International Workshop on Baryon and Lepton Number Violation (BLV2019) was hosted by the Institute for Theoretical Physics (IFT) in Madrid, on October 21-24, 2019.
Oral contributions were by invitation only, except for PhD students, who were welcome to apply to participate in the PhD forum with a 5 min. plenary talk complemented with a poster on the same subject.

145 participants

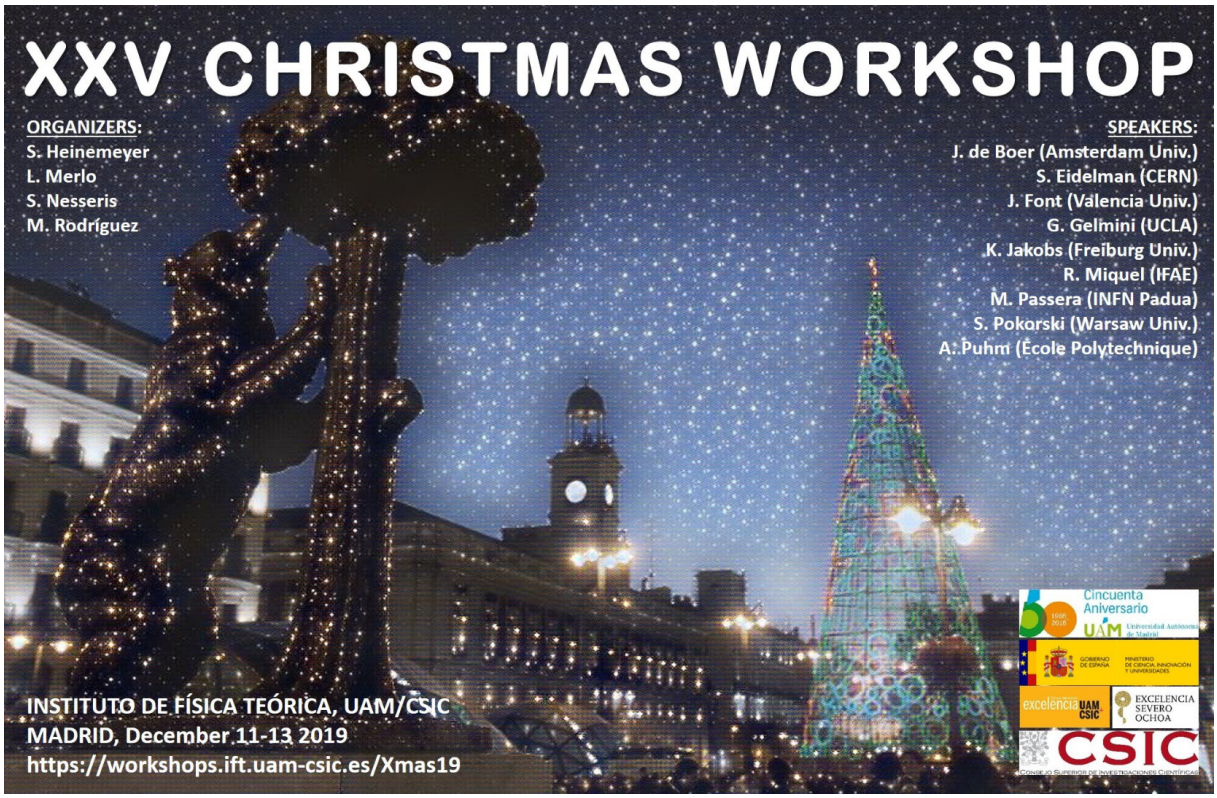
International Organizing Committee:
Co-chairs: Pavel Fileviez Perez (Case Western Reserve University), Belen Gavela (IFT)
Members: Asmaa Abada (Laboratoire de Physique Theorique d'Orsay), Laura Baudis (University of Zurich), Robert H. Bernstein (Fermilab), Marcela Carena (Fermilab), Vicenzo Cirigliano (Los Alamos), Enrique Fernandez-Martinez (IFT),, Thomas Hambye (Université Libre de Bruxelles), Karsten Heeger (Yale University), Luca Merlo (IFT), Ann Nelson (University of Washington), José Miguel No (IFT), Silvia Pascoli (IPPP-Durham), Nuria Rius (IFIC)

https://indico.cern.ch/event/754031/

Euclid WP10 2-day meeting

5-6/11/2019

Organizers: Matteo Martinelli (IFT), Savvas Nesseris (IFT), Mónica Vergel (IFT)


XXV CHRISTMAS WORKSHOP
ORGANIZERS:
S. Heinemeyer
L. Merlo
S. Nesseris
M. Rodríguez
SPEAKERS:
J. de Boer (Amsterdam Univ.)
S. Eidelman (CERN)
J. Font (Valencia Univ.)
G. Gelmini (UCLA)
K. Jakobs (Freiburg Univ.)
R. Miquel (IFAE)
M. Passera (INFN Padua)
S. Pokorski (Warsaw Univ.)
A. Puhm (École Polytechnique)
INSTITUTO DE FÍSICA TEÓRICA, UAM/CSIC
MADRID, December 11-13 2019
https://workshops.ift.uam-csic.es/Xmas19
Cincuenta Aniversario
UAM
CSIC


ift
Instituto de Física Teórica
UAM-CSIC

XXV IFT Christmas Workshop

11-13/12/2019

This was the XXV edition of our annual Christmas Workshop at the Instituto de Física Teórica (IFT).

Several world-leading experts gathered at the IFT to discuss with the local staff the recent developments in Theoretical Physics and Cosmology.

The workshop was held at the facilities of the IFT on the campus of the Universidad Autónoma de Madrid (UAM).

Organizers: Sven Heinemeyer (IFT), Luca Merlo (IFT), Savvas Nesseris (IFT), María J. Rodríguez (IFT), Mónica Vergel (IFT)

Web: https://workshops.ift.uam-csic.es/Xmas19

III GRASS family and friends "almond tree" Meeting

19-20/12/2019

The third "almond tree" meeting organized by the GRAvity, Supergravity and Superstrings (GRASS) family took place on December 19th and December 20th 2019. Like in previous editions, the meeting was conceived for former IFT-UAM/CSIC PhD students working on related areas abroad and coming home to their biological and scientific families and friends for Christmas. The meeting was an opportunity to learn first-hand from them what people are working on around the world and to evocate their not-so-distant past as IFT PhD students.

The meeting was open to everybody, with no registration required.
Location: Aula Gris 1

Pablo Bueno (Centro Atómico Bariloche), Pablo A. Cano, (KU Leuven), Tomás Ortín, (IFT), Pedro F. Ramírez, (INFN Milano), Carlos S. Shahbazi, (U. Hamburg)


HoloMatter
IFT Madrid 9-13 March 2020
Electron hydrodynamics
Quantum phases of matter
Quantum bounds on transport
Strongly coupled systems
Effective theories for broken symmetries
Organizers
Daniel Areán
Matteo Baggioli
Amadeo Jiménez
Karl Landsteiner
holomatter2020@gmail.com
https://workshops.ift.uam-csic.es/holomatter
Comunidad de Madrid
CONSEJERÍA DE EDUCACIÓN
CSIC
UNIVERSIDAD AUTONOMA DE MADRID
GOBIERNO DE ESPAÑA
MINISTERIO DE CIENCIA, INNOVACIÓN Y UNIVERSIDADES
ift
Instituto de Física Teórica
UAM-CSIC

Future Collider Network Workshop

10-11/02/2020

Annual meeting of the Spanish network for future colliders

25 participants

Webpage: https://indico.ific.uv.es/event/3988/

HoloMatter

9-13/03/2020

HoloMatter brought together experimentalists and theorists; high energy physics with low energy challenges. Researchers exploring connections between geometry, hydrodynamics and novel phases of matter had the chance to benefit from this interdisciplinary environment.

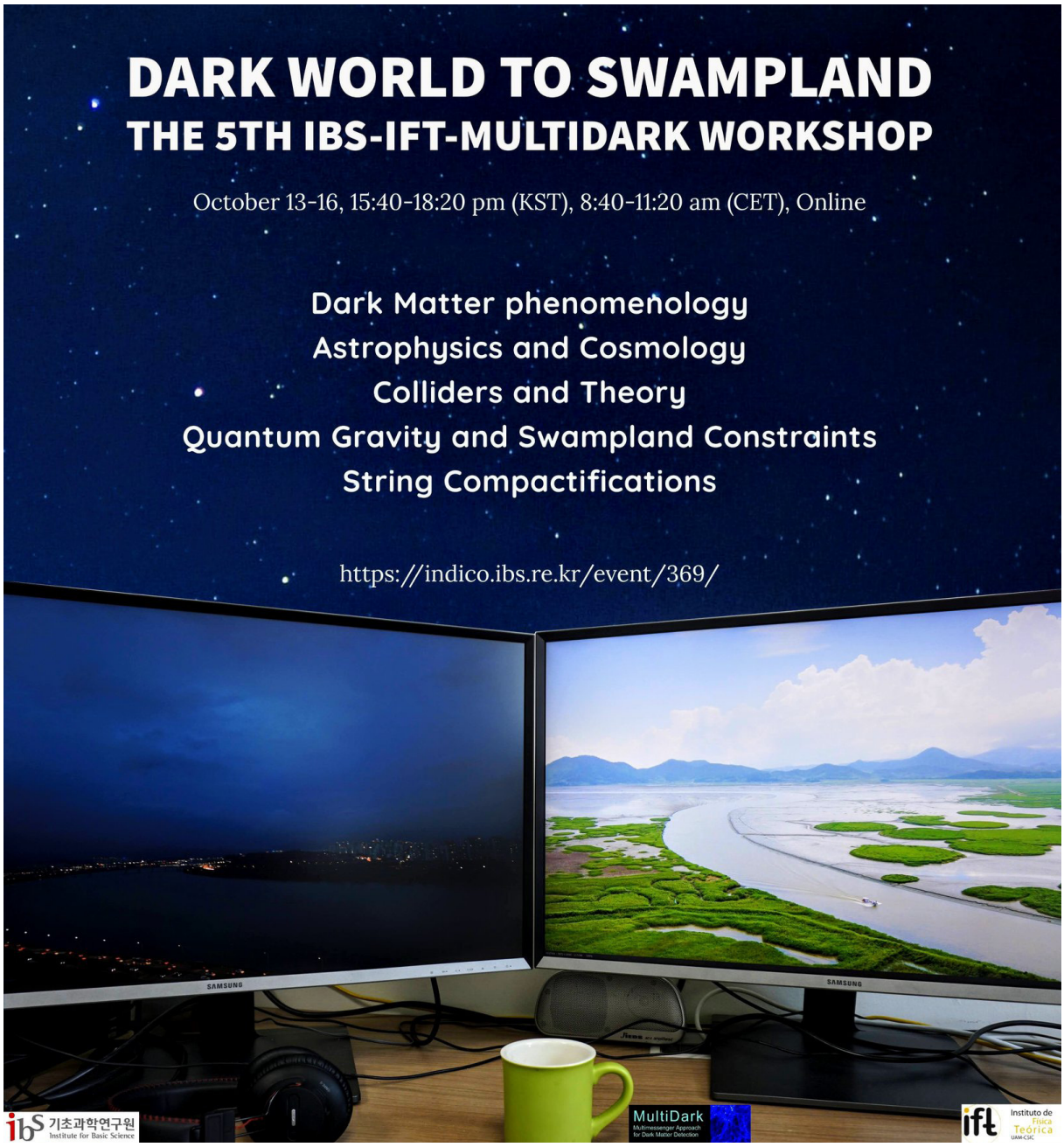
TOPICS:
Strongly coupled systems
Quantum phases of matter
Electron hydrodynamics
Effective theories for broken symmetries
Quantum bounds on transport

46 participants

Organizers: Daniel Areán (IFT), Matteo Baggioli (IFT), Amadeo Jiménez (IFT), Karl Landsteiner (IFT)

Webpage: https://workshops.ift.uam-csic.es/holomatter

Due to the declaration of the COVID19 pandemic while the workshop was taking place, it continued in online format, and led to the launch of the very successful seminar streaming Webpage and Youtube channel Holotube


DARK WORLD TO SWAMPLAND
THE 5TH IBS-IFT-MULTIDARK WORKSHOP
October 13-16, 15:40-18:20 pm (KST), 8:40-11:20 am (CET), Online
Dark Matter phenomenology
Astrophysics and Cosmology
Colliders and Theory
Quantum Gravity and Swampland Constraints
String Compactifications
https://indico.ibs.re.kr/event/369/
SAMSUNG
SAMSUNG
ibs 기초과학연구원 Institute for Basic Science
MultiDark
Multimessenger Approach for Dark Matter Detection
ift Instituto de Física Teórica UAM-CSIC

5th IBS-IFT-MultiDark workshop

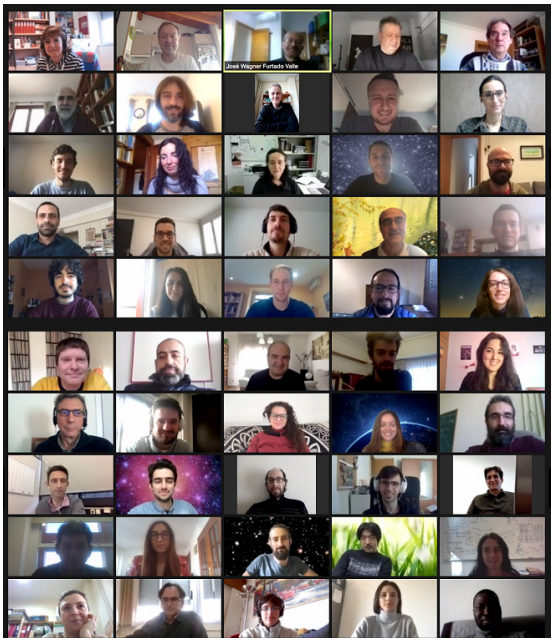
13-16/10/2020 (online)

The IBS-IFT-MultiDark Workshop is a regular event organized jointly by IFT, MultiDark, and IBS-CTPU. The purpose of this workshop is to exchange ideas, to promote collaborations, and to discuss recent developments in theoretical high energy physics.
This edition of the workshop was oriented towards string phenomenology (Oct 13 and 15), as well as dark matter and particle physics (Oct 14 and 16), and covered a wide range of research topics.
Under the circumstances the event was held online via Zoom.

129 participants

Organizers: Kiwoon Choi (IBS), Carlos Muñoz (IFT), David G. Cerdeño (IFT), Sanghyeon Chang (IFT), Sven Heinemeyer (IFT), Seung-Joo Lee (IFT), Fernando Marchesano (IFT), Chang Sub Shin (IFT), Miguel Angel Sanchez Conde (IFT)

Webpage: https://indico.ibs.re.kr/event/369/




1.5 m
XXVI IFT XMAS WORKSHOP
December 16th-18th, 2020 | workshops.ift.uam-csic.es/Xmas20
Nima Arkani-Hamed (IAS)
Jesse Thaler (MIT)
Alessandra Buonanno (MPI-G)
Thomas Schwetz (KIT)
Zohreh Davoudi (U. Maryland)
Manfred Lindner (MPI-K)
George Efstathiou (KICC)
Pol Forn-Díaz (IFAE)
Netta Engelhardt (MIT)
ORGANIZERS: Jose Barbón, Sven Heinemeyer, Gregorio Herdoiza, Esperanza Lopez, Michele Maltoni, Luca Merlo, Savvas Nesseris

XXVI IFT Christmas Workshop

16-18/12/2020 (online)

From December 16 to December 18, 2020 we celebrated the XXVI edition of our annual Christmas Workshop at the Instituto de Física Teórica (IFT).

Several world-leading experts gathered virtually at the IFT to discuss with the local staff the recent developments in Theoretical Physics and Cosmology.

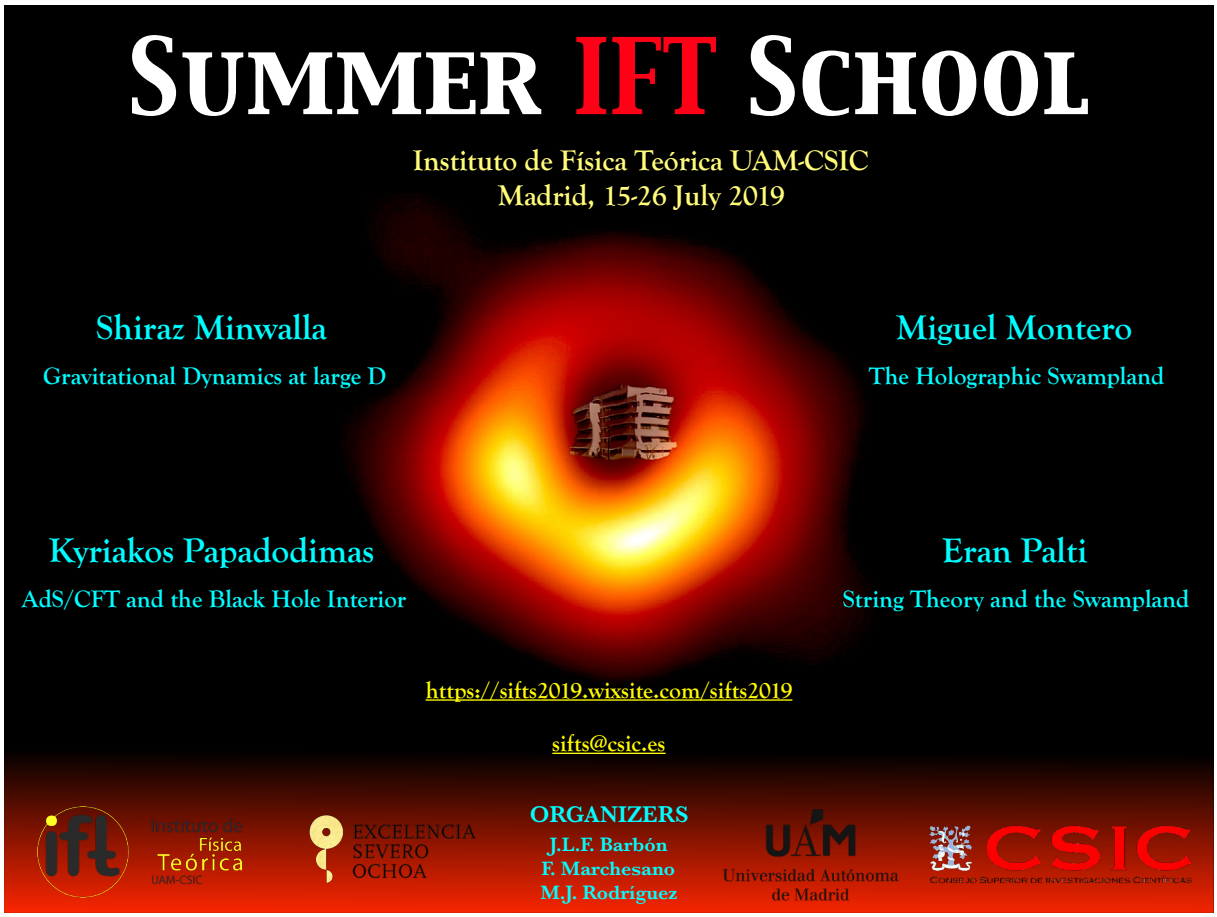
The workshop was held online this year. Recordings of the talks can be found on our YouTube channel IFTWebinars.

97 participants

Organizers: José L. F. Barbón (IFT), Sven Heinemeyer (IFT), Gregorio Herdoíza (IFT), Esperanza López (IFT), Michele Maltoni (IFT), Luca Merlo (IFT), Savvas Nesseris (IFT), Mónica Vergel (IFT).

Webpage: https://workshops.ift.uam-csic.es/Xmas20

Escuelas
Schools



Summer IFT School (SIFTS)

15-26/07/2019

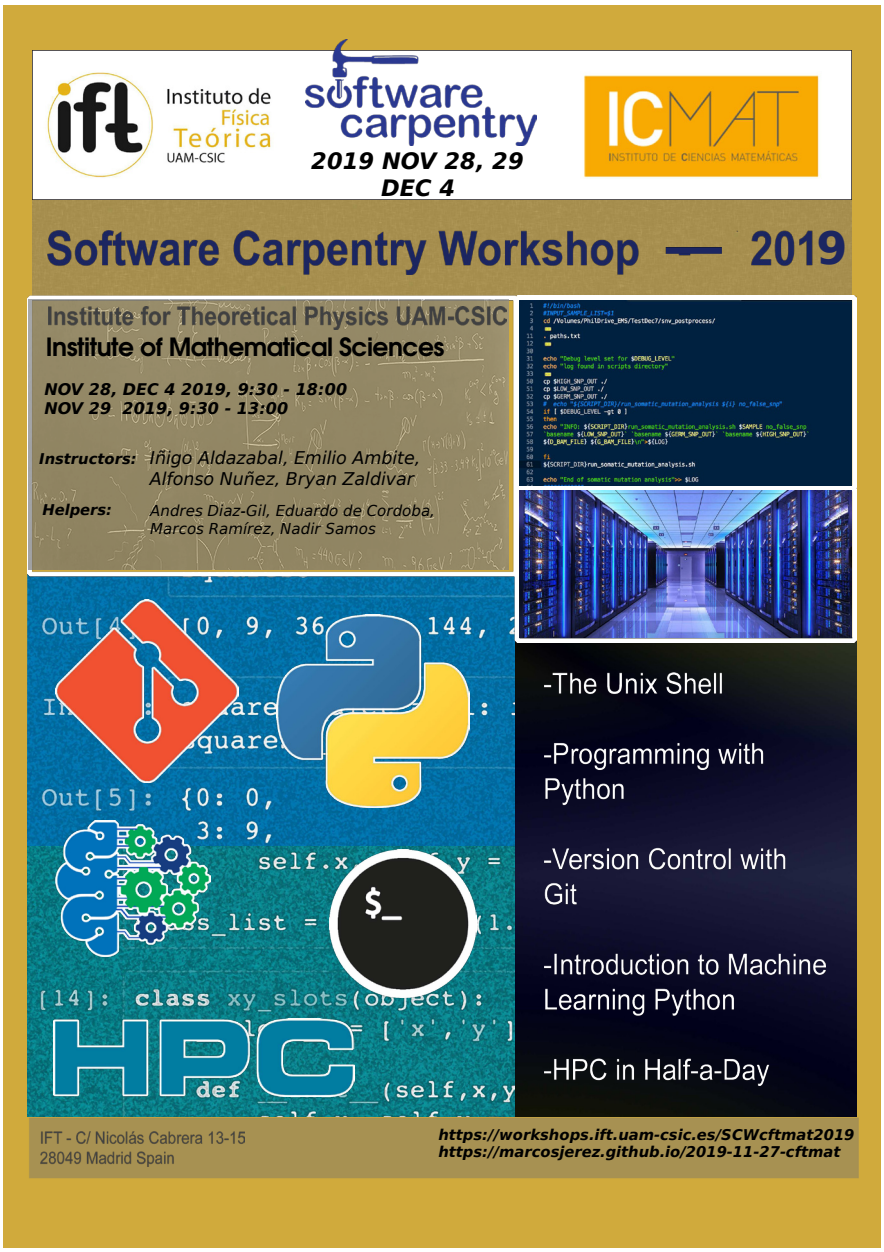
Summer IFT School (SIFTS) is a new intensive two-week summer program typically intended for graduate student considering a career in theoretical physics. The SIFTS program is designed to provide lectures and informal sessions on the latest advances and open questions in various areas of theoretical physics. This year the SiftS school was dedicated to "Recent developments on Holography and String Theory"

Organizers: J.L.F. Barbon, F. Marchesano, M.J. Rodriguez

Speakers and topics:
Shiraz Minwalla, Gravitational Dynamics at Large D
Miguel Montero, The Holographic Swampland
Eran Palti, String Theory and the Swampland
Kyriakos Papadodimas, AdS/CFT and the Black Hole Interior

50 participants

Webpage: https://sifts2019.wixsite.com/sifts2019


Instituto de Física Teórica UAM-CSIC
software carpentry
2019 NOV 28, 29
DEC 4
ICMAT INSTITUTO DE CIENCIAS MATEMÁTICAS
Software Carpentry Workshop — 2019
Institute for Theoretical Physics UAM-CSIC
Institute of Mathematical Sciences
NOV 28, DEC 4 2019, 9:30 - 18:00
NOV 29 2019, 9:30 - 13:00
Instructors: Iñigo Aldazabal, Emilio Ambite, Alfonso Nuñez, Bryan Zaldivar
Helpers: Andres Diaz-Gil, Eduardo de Cordoba, Marcos Ramírez, Nadir Samos
-The Unix Shell
-Programming with Python
-Version Control with Git
-Introduction to Machine Learning Python
-HPC in Half-a-Day
HPC
IFT - C/ Nicolás Cabrera 13-15
28049 Madrid Spain
https://workshops.ift.uam-csic.es/SCWcftmat2019
https://marcosjerez.github.io/2019-11-27-cftmat

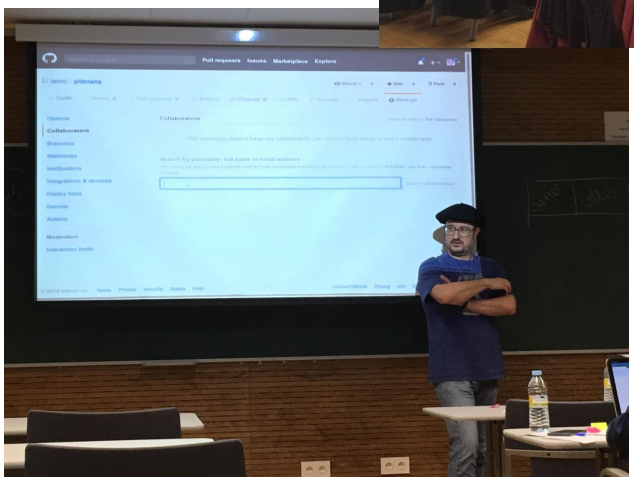
IFT+ICMAT Software Carpentry Workshop

28-29/11/2019

Software Carpentry aims to help researchers get their work done in less time and with less pain by teaching them basic research computing skills. This hands-on workshop covered basic concepts and tools, including program design, version control, data management, and task automation. Participants were encouraged to help one another and to apply what they have learned to their own research problems.

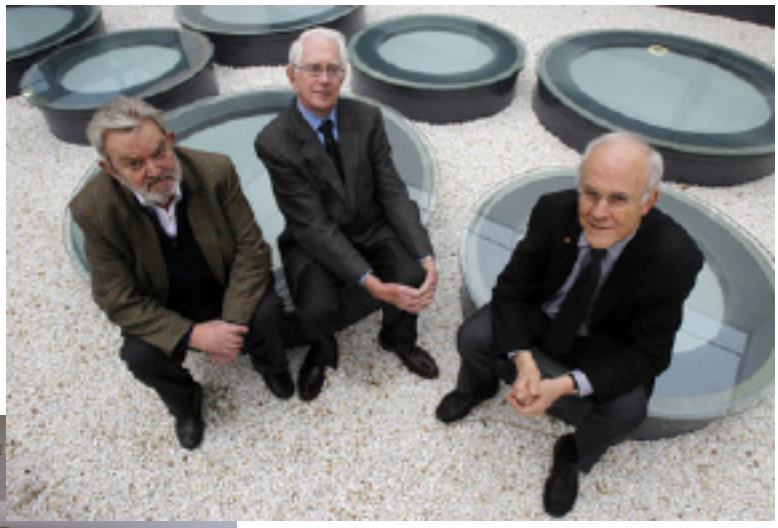
Organizers: Marcos Ramírez (IFT), Eduardo de Córdoba (IFT), Andrés Díaz-Gil (SGAD), Nadir Samos (IFT), Mónica Vergel (IFT)

https://workshops.ift.uam-csic.es/SCWcftmat2019



12

Seminarios y Visitantes
Seminars and Visitors



Resumen

Una característica típica de los centros de investigación punteros es poseer un intenso programa de visitas y seminarios. Nuestra actividad ha sido y sigue siendo muy destacada en este terreno como denota la lista que presentamos a continuación. El número total de seminarios y actividades similares organizadas en el IFT supera la media centena. Resaltamos que la gran mayoría de conferenciantes provienen de Institutos y centros de investigación extranjeros.

Es de destacar también las estancias prolongadas o sabáticos de renombrados investigadores extranjeros en nuestro Instituto. Son un claro indicador del interés que el entorno científico del IFT despierta en investigadores de todo el mundo.

Asimismo destacamos los programas de Visitantes de Excelencia asociados al proyecto Severo Ochoa:

- El programa de Profesores Distinguidos, investigadores de renombre internacional líderes en sus campos.

- El programa de Investigadores Asociados, expertos internacionales de reconocido prestigio.

Overview

A characteristic tract of leading research centres is the existence of an intense program of seminars and visits. Our activity has been and continues to be very high in this aspect, as demonstrated by the list that we will present. The total number of seminarsand similar activities organized in our premises is well above 50. We underline the fact that the vast majority of speakers belong to foreign institutes and research centres.

We should emphasize also the long-term stays of prestigious foreign scientists in our Institute. This is a clear indicator of the interest that the scientific environment provided by our Institute arises in researchers worldwide.

Finally, the IFT has established several Excellence Visitor Programs, in the framework of the Severo Ochoa grant:

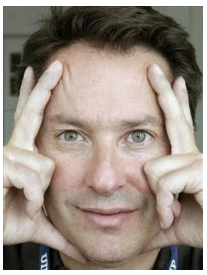
- Dinstinguished Professor Program, for researchers with established international reputation as leaders in their fields.

- Associate Researcher Program, for international experts in their fields.

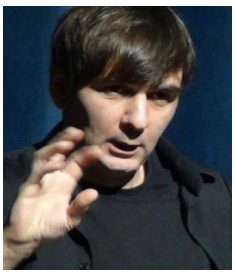
Visitas científicas al IFT
Research Stays at the IFT

Luis Álvarez-Gaumé
CERN, Geneva
Simons Center, Stony Book

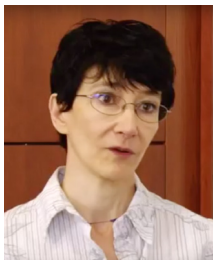
Nima Arkani-Hamed
IAS Princeton



Ignacio Cirac,
Max Planck Institute
for Q. Optics, Munich



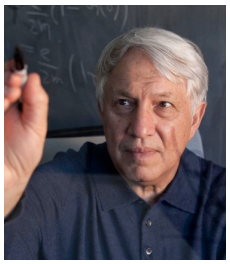
Gia Dvali,
LMU Munich



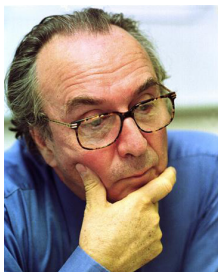
Graciela Gelmini
UCLA

Renata Kallosh,
Stanford Univ.

Dmitri Kharzeev,
Strony Brook Univ.



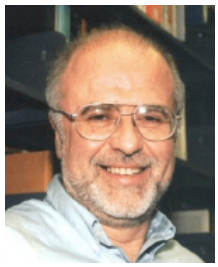
Andrei Linde,
Stanford Univ.



Luciano Maiani,
U. Roma la Sapienza

Aneesh Manohar
U. California San Diego

Slava Mukhanov,
LMU Munich



Herbert Neuberger,
Rutgers Univ.

Lisa Randall,
Harvard Univ

Alexei Smirnov,
MPIK Heidelberg
& ICTP Trieste

Profesores Distinguidos SO

En el marco del proyecto Severo Ochoa, el IFT ha establecido el programa de Profesores Distinguidos SO, de visitantes de reconocido liderazgo y eminencia en sus campos.

La lista de Profesores Distinguidos SO del IFT se encuentra en la página opuesta.

SO Distinguished Professors

Within the framework of the Severo Ochoa grant, the IFT has established the SO Distinguished Professor program, to host scientific stays for world-wide recognized leaders in their research fields.

The list of SO Distinguished Professors is in the opposite page.

Visitas de Profesores Distinguidos SO en 2019-2020
SO Distinguished Professor Visits in 2019-2020

Nombre/Name	Institución/Institution	Fechas/Dates	Información /Information
Luis Álvarez-Gaumé	Simons Center	4-14/10/19	Scientific Advisory Board visit
Graciel Gelmini	UCLA	8-11/10/19	Scientific Advisory Board visit
Luciano Maiani	CERN	8-12/10/19	Scientific Advisory Board visit
Slava Mukhanov	LMU Munich	28/10/19 - 2/11/19	IFT Colloquium
Dmitri Kharzeev	Stony Brook University	26/10/19 - 2/11/19	IFT Colloquium
Graciel Gelmini	UCLA	7-14/12/19	Christmas Workshop

Investigadores Asociados SO

En el marco del proyecto Severo Ochoa, el IFT ha establecido el programa de Investigadores Asociados SO, de visitantes expertos de reconocido prestigo internacional en sus campos. La lista de Investigadores Asociados SO del IFT es:

- Gerardo Aldazabal,
  Instituto Balseiro, Bariloche, Argentina
- Eric Bergshoeff
  University of Groningen
- David G. Cerdeño
  IPPP Durham
- Maxim Chernodub,
  CNRS Tours Univ.
- Kiwoon Choi,
  CTPU, Institute for Basci Science, S.Korea
- Antonio Delgado,
  Notre Dame Univ, USA
- José Ramón Espinosa,
  ICREA & IFAE, Barcelona
- Victor Fadin
  Novosibirsk State University
- Anamaria Font,
  Universidal Nacional Caracas
- Concha González-García
  ICREA & U. Barcelona & Stony Brook
- Thomas Habye
  Université Libre de Bruxelles
- Pilar Hernández,
  IFIC & Univ. Valencia
- Sascha Husa
  U. Iles Balears & LIGO
- Alejandro Ibarra,
  T.U. Munich
- Yolanda Lozano,
  Universidad de Oviedo
- Yann Mambrini
  CNRS& Orsay France
- Vicent Mateu
  U. Salamanca
- Patrick Meessen,
  Universidad de Oviedo
- Olga Mena,
  IFIC, Valencia

SO Associate Researchers

Within the framework of the Severo Ocho grant, the IFT has established the SO Associate Researcher program, to host scientific stays for international experts in their research fields. The list of SO Associate Researchers is:

- Frederic Nowacki,
  U. Strasbourg, CNRS
- Masanori Okawa,
  Hiroshima Univ.
- Toshihiro Ota
  Yachay Tech
- Kyriakos Papadodimas
  CERN
- Silvia Pascoli,
  IPPP, Univ. Durham, UK
- Stefan Pokorski
  U. Warsaw
- Mariano Quirós,
  ICREA & IFAE, Barcelona
- Alberto Ramos
  Trinity College Dublin
- Stefano Rigolin
  INFN Padova
- Douglas Ross,
  Southampton Univ, UK
- Verónica Sanz
  U. Sussex
- Gary Shiu,
  Hong-Kong U & Wisconsin U.
- Joan Simón,
  Edinburgh Univ, UK.
- Alicia Sintes
  U. Iles Balears & LIGO
- Pietro Slavich
  CNRS & LPTHE
- Erik Tonni,
  INFN & SISSA Trieste
- Miguel Ángel Vázquez-Mozo,
  U. Salamanca
- Jos Vermaseren,
  NIKHEF Amsterdam
- Guifre Vidal
  Perimeter Institute

Visitas de Investigadores Asociados SO en 2019-20
SO Associate Researcher Visits in 2019-2020

Nombre/Name	Institución/Institution	Fechas/Dates
Maxim Chernodub	University of Tours	11-13/12/2019
Maxim Chernodub	University of Tours	23-30/10/19
Maxim Chernodub	University of Tours	10-15/2/19
Maxim Chernodub	University of Tours	7-11/4/19
Antonio Delgado	University of Notre Dame	9-17/3/19
Antonio Delgado	University of Notre Dame	13/6/19 - 1/8/19
Antonio Delgado	University of Notre Dame	7-12/3/20
Anamaria Font	Univ. Central de Venezuela	23-29/9/19
Anamaria Font	Univ. Central de Venezuela	29/10/19 - 30/11/19
Concha González-García	U. Barcelona	14-15/10/19
Thomas Hambye	ULB	3/5/19 - 6/6/19
Pilar Hernández	IFIC Valencia	28-29/11/19
Masanori Okawa	Hiroshima University	20/2/19 - 2/3/19
Kyriakos Papadodimas	ICTP	21-26/7/19
Kyriakos Papadodimas	ICTP	8-12/9/19
Mariano Quirós	IFAE Barcelona	9-21/3/19
Alberto Ramos	Trinity College Dublin	1-6/7/19
Verónica Sanz	University of Sussex	7-13/4/19
Pietro Slavich	LPTHE Paris	23-30/6/19
Stefan Pokorski	Warsaw University	8-13/12/19
Erik Tonni	SISSA	8-21//19
Jos Vermaseren	NIKHEF	1/2/19 - 3/3/19
Jos Vermaseren	NIKHEF	6-29/5/19
Jos Vermaseren	NIKHEF	1/2/20 - 1/3/20

Otros Visitantes / Other Visitors

Nombre/Name	Fechas/Dates
J. A. Aguilar-Saavedra	31/1/19 - 1/2/19
J. A. Aguilar-Saavedra	22-25/2/19
N. Ahmed	1-31/7/19
A. Alberdi	16/1/19
I. Aldazábal	10-11/1/19
G. Alonso	29-31/5/19
M. Ammon	9-11/3(20
S. Andriolo	9/4/19 - 30/6/19
N. Atlam	1/12/19 - 31/1/20
P. Auclair	13-18/1/19
H. Baer	23/6/10 - 6/7/19
P. Bakhti	1/10/19 - 25/12/19
P. Bakhti	1/5/19 - 28/7/19
V. Balasubramanian	8-15/9/19
S. Banerjee	24/1/19 - 2/3/19
T. Banks	10-28/9/19
G. Barnich	21-23/10/19
M. Bastero-Gil	28/9/19 - 2/10/19
K. Behnia	5-12/3/19
E. Belgacem	13-19/1/19
A. Bera	8-25/4/19
T. Biekotter	27-31/1/20
D. Blas	10-15/10/19
M. Boudad	17-23/6/19
P. Bueno	2-20/9/19
P. Bueno	18-20/12/19
D. Burger	1/4/19 - 30/6/19
M. E. Cabrera	11-26/6/19
P. Calabrese	9-12/9/19
P. Cano	18-20/12/19
C. Caprini	15-17/1/19
A. Caputo	28-29/1/19
S. Cerri	8-15/6/19
M. Chakraborti	5-30/10/19
S. Cho	11-19/11/19
E.-J. Chun	29/10/19 - 30/11/19
S. Clesse	14-17/1/19
S. Collins	7/11/19
P. Coloma	15/3/19
J. Conlon	25-27/9/19
D. Croon	15/10/19 - 25/11/19
D. Cutting	13-18/1/19
D. Cutting	10-12/11/19
L. D'Alessi	25-30/11/19
Y. Dai	11-18/11/19
A. Dauphin	31/5/19 - 5/6/19
R. Davidson	8-14/3/20
J. De Boer	12-13/12/19
F. De Juan	11-16/2/19
P. De la Torre	1/10/19 - 31/1/20
C. De Rahm	14-15/1/19
L. Del Debbio	31/3/19 - 2/4/19
L. Delacretaz	7-13/3/20
M. Delgado	28/3/19 - 26/7/19
E. Di Valentino	19-21/1/19
F. Domingo	31/3/19 - 3/4/19
F. Domingo	3-6/12/19
Y. Du	9/6/19 - 6/7/19
J. Dubail	8-14/9/19
B. Dutta	13-24/6/19
I. Esteban	7-20/1/19
I. Esteban	24-28/6/19

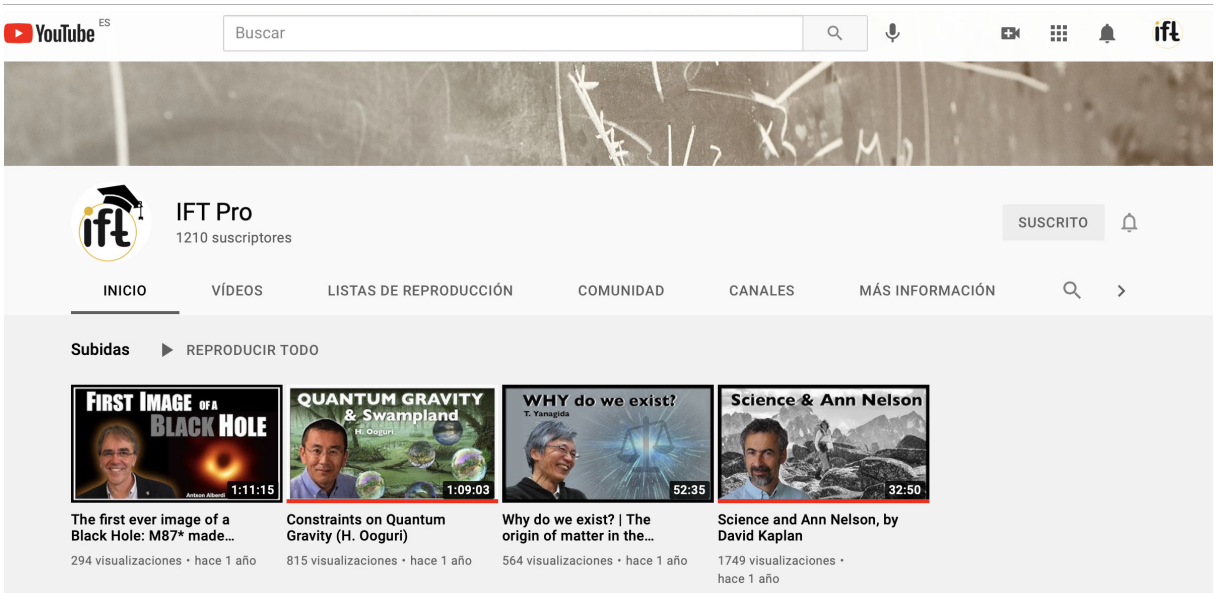
S. Eydelman	10-15/12/19
F. Faedo	18-20/11/19
M. Fasiello	14-18/1/19
P. Fernández-Ramírez	19-20/12/19
J. J. Fernández Melgarejo	18-20/12/19
J. Fesel	27/2/19 - 1/3/19
P. Fleury	13-15/2/19
J. A. Font	11-13/12/19
V. Forini	28-31/5/19
O. Fornieri	11/1/19 - 9/7/19
G. Fraciolini	1-14/3/20
S. Franco	23-30/9/19
P. Fritzsch	5-10/3/19
J. Fumagalli	6/11/19
M. K. Gaillard	4-31/3/19
I. García	23/9/19 - 1/10/19
M. García	10-15/2/19
D. García-Figueroa	17-21/11/19
D. García	13-27/3/19
D. García	4-20/10/19
D. García	7-22/1/20
D. García	27-31/1/20
M. P. García del Moral	17-19/7/19
M. P. García del Moral	23/12/19 - 6/3/20
E. García-Valdecasas	16-20/12/19
J. Garriga	11/10/19
S. Gieseke	8-13/4/19
J. Gomis	26/29/3/19
D. Gordo	1-27/3/19
B. Gaoutéraux	9-12/3/20
G. Gozaliasl	6-26/10/19
J. Gracia-Bondía	17-18/6/19
J. Gracia-Bondía	14/10/19 - 14/1/20
S. Gray	2-12/12/19
T. Grimm	24-27/9/19
S. Grozdanov	8-13/3/10

A. Grushin	11-15/2/19
U. Haisch	17-19/2/19
A. Hebecker	24-30/9/19
J. Heckman	24-28/9/19
B. Heidenreich	23-28/9/19
M. Heller	8-12/2/19
M. Herrero	18/3/19
M. Herrero	26-30/4/19
M. Herrero	28/5/19 - 18/6/19
M. Herrero	9-14/10/19
M. Herrero	15/12/19 - 7/1/20
M. Hindmarsh	13-18/1/19
N. Hogg	13/1/20 - 13/3/20
C. Hoyos	9-13/2/20
M. Hunter	26/8/19 - 1/10/19
N. Iqbal	6-9/10/19
K. Ishikawa	1-7/3/20
A. Jain	3-6/12/19
K. Jakobs	12-13/12/19
A. Jenkins	14/3/19 - 10/6/19
K. Jensen	9-11/3/20
R. Jiménez	20-22/1/20
F. Joswig	5-10/3/19
R. Juergen	9-13/2/20
T. Julie	25-30/11/19
D. B. Kaplan	19-25/10/19
M. Kherlakian	1/3/20 -13/3/20
M. Kim	23-29/9/19
S. King	23-29/9/19
P. Ko	28/5/19 - 2/6/19
R. Kogler	5-7/5/19
E. Kolb	21/6/19 - 6/7/19
T. Konstantin	13-18/1/19
J. Kozaczuk	13-17/1/19
P. Kozow	23-28/2/20
A. Kridun	16-19/2/20

C. Krishnan	24-29/9/19
S. Kuroyanagi	24-29/9/19
I. Lara	10/12/19
L. Lellouch	17-21/5/19
M. Lewicki	8-18/1/19
Q. Li	9-18/2/19
Y. Li	16-29/6/19
R. Linares	25/7/19 - 24/8/19
R. Lineros	8-15/2/19
R. Lineros	21-23/2/19
J. List	23/6/19 - 5/7/19
T. Liu	16-29/6/19
Z. Liu	8-16/6/19
J. López Pavón	16-20/12/19
A. Ludwig	7-14/9/19
E. Madge	13-19/1/19
F. J. Maldonado	1/2/19 - 31/7/19
M. Mangano	9-11/10/19
R. Mann	15-21/9/19
X. Marcano	8-12/3/19
X. Marcano	7-10/1/20
A. Marrani	13-19/10/19
V. Martín-Lozano	18-22/3/19
V. Martín-Lozano	23-24/5/19
V. Martín-Lozano	21-28/10/19
C. Martins	5-6/11/19
J. Matias	16-18/6/19
K. Mawatari	30/6/19 - 6/7/19
L. Melo	15-29/6/19
R. Meyer	22-26/9/19
R. Meyer	8-10/3/20
R. Miquel	11/12/19
D. Mitsios	3/3/20 - 13/3/20
M. Montero	18/7/19 - 1/8/19
M. Montero	21-29/9/19
G. Moortgat-Pick	3-26/6/19
A. Morales	10-13/10/19
R. Moraru	28/9/19 - 16/10/19
I. Musco	9-10/5/19
S. Naval	7-18/7/19
D. Nogradi	15-18/12/19
P. Ntokos	19-29/6/19
E. O' Colgain	4-5/3/20
G. Obied	23-29/9/19
M. O. Olea	28-29/3/19
M. O. Olea	25-31/1/20
K. Olive	10-16/6/19
J. Olle	25/2/19 - 20/3/19
G. Olmo	13/5/19
H. Ooguri	25-29/9/19
R. Orús	26-27/5/19
E. Palti	5-13/3/19
E. Palti	14-20/7/19
E. Palti	24-28/9/19
M. Passera	11-13/12/19
F. Peña Benítez	7-16/2/19
M. Petac	3-7/2/20
A. Petiteau	14-18/1/19
P. Philips	7-11/3/20
E. Pinsard	2-13/3/20
N. Pinzani	8-13/3/20
W. Porod	9-11/12/19
A. Portelli	10-13/3/20
F. Prada	11-13/12/19
F. Prada	16-17/1/20
F. Prada	11-13/2/20
S. Prakash	25/5/19 - 1/6/19
D. Preti	6-8/3/19
A. Puhm	11-14/12/19
P. Quílez	18-19/11/19
P. Quílez	19-20/12/19
J. C. Quiñones	14-27/7/19
M. Rajaee	1/5/19 - 31/7/19
M. Rajaee	11/11/19 - 31/1/20
G. Ramírez	12-26/6/19
M. Ramírez	13-14/1/20

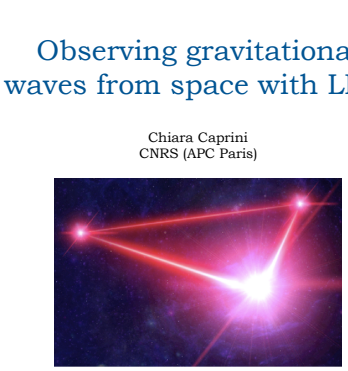
M. Ramsey-Musolf	7&6/19 - 6/7/19
M. Rehman	12/1/19 - 1/2/19
G. Remmen	22-28/9/19
A. Renzini	13-18/1/19
A. Retolaza	3-4/6/19
A. Retolaza	23-27/9/19
L. Reverberi	13-17/1/20
A. Ricciardone	8-19/1/19
F. Riccioni	12-15/2/19
M. Rigol	8-13/9/19
S. Robles	9/1/19 - 9/2/19
F. Romero	31/1/19 - 1/2/19
F. Romero	25-26/4/19
F. Romero	5-7/5/19
F. Rompineve	4-5/2/19
D. Rosa	25-28/6/19
T. Rudelius	23-28/9/19
J. E. Ruiz	11-15/2/19
J. E. Ruiz	16-20/9/19
R. E. Ruiz	29/9/19 - 1/10/19
I. Salazar	9-16/9/19
P. Salgado	21-24/1/20
R. Savelli	27/1/19 - 3/2/19
R. Savelli	29/9/19 - 5/10/19
K. Schalm	9-10/3/20
Q. Shafi	16-25/6/19
N. Shah	9-30/6/19
C. Shahbazi	16-20/12/19
C. Shahbazi	24/6/19 - 1/7/19
C. Shahbazi	13-21/2/20
Q. Shi	11-19/11/19
R. Shir	17/3/19 - 4/4/19
K. Skenderis	22-26/4/19
C. Skordis	27/4/19 - 2/5/19
D. Sorokin	12-26/11/19
S. Sotiriadis	1-5/12/19
M. Spannowsky	1-5/7/19
M. Spannowsky	26-29/3/19
W. Staessens	13-17/3/19
B. Stefanek	13-18/1/19
M. Stref	23-26/4/19
S. Su	23/6/19 - 6/7/19
W. Su	11/6/19 - 7/7/19
O. Sumensari	22-24/5/19
T. Takayanagi	8-13/9/19
C. Tamarit	24/3/19 - 1/4/19
C. Tamarit	20/12/19
M. Taoso	25/2/19 - 3/3/19
W. Taylor	23-27/9/19
A. Teixeira	29/6/19 - 7/7/19
F. Tello	7/2/19 - 16/3/19
J. Tian	21-29/6/19
I. Tokatly	8-10/4/19
E. Torrente Luján	18-21/12/19
M. Tórtola	11/3/19
K. Trachenko	9-11/3/20
T. Yanagida	19/10/19 - 14/11/19
A. Urbano	27-31/1/19
I. Valenzuela	23-28/9/19
J. C. Várilly	15/3/19 - 14/6/19
F. Vernizzi	13-16/1/19
F. Villaescusa	26-27/11/19
M. Vitti	17-23/11/19
A. Vladikas	14-17/10/19
F. Von der Pahlen	20-26/7/19
T. Weigand	13-17/3/19
T. Weigand	26/6/19 - 6/7/19
G. Weiglein	25-29/9/19
D. Weir	13-18/1/19
D. Weir	10-14/6/19
A. Westphal	24-27/9/19
J. Zaanen	8-13/3/20
H. Zhou	11-19/11/19
G. Zoupanos	7-15/12/19

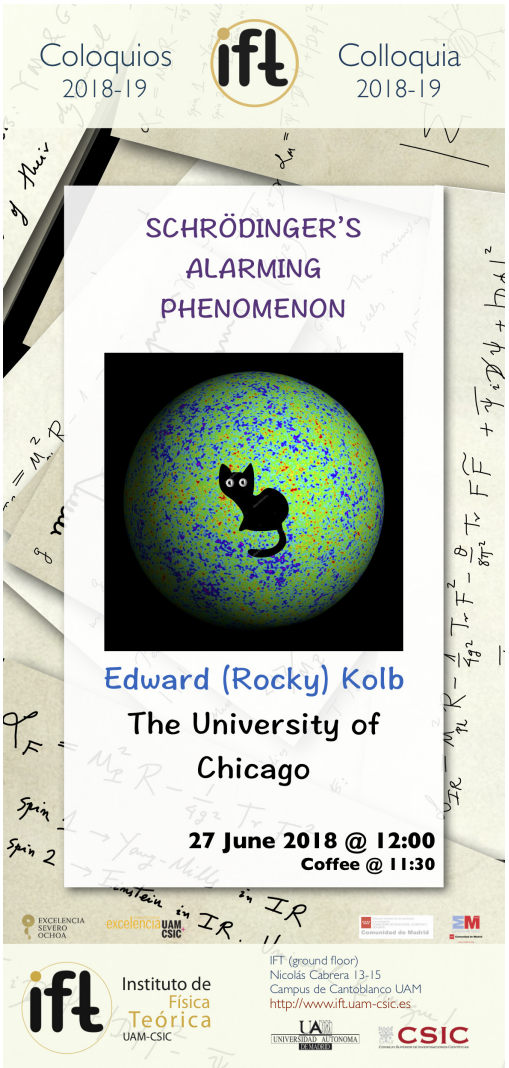
Coloquios/ Colloquia



January 17th 2019,
Chiara Caprini
AstroParticle and Cosmology Center, Paris
Observing gravitational waves from space with LISA

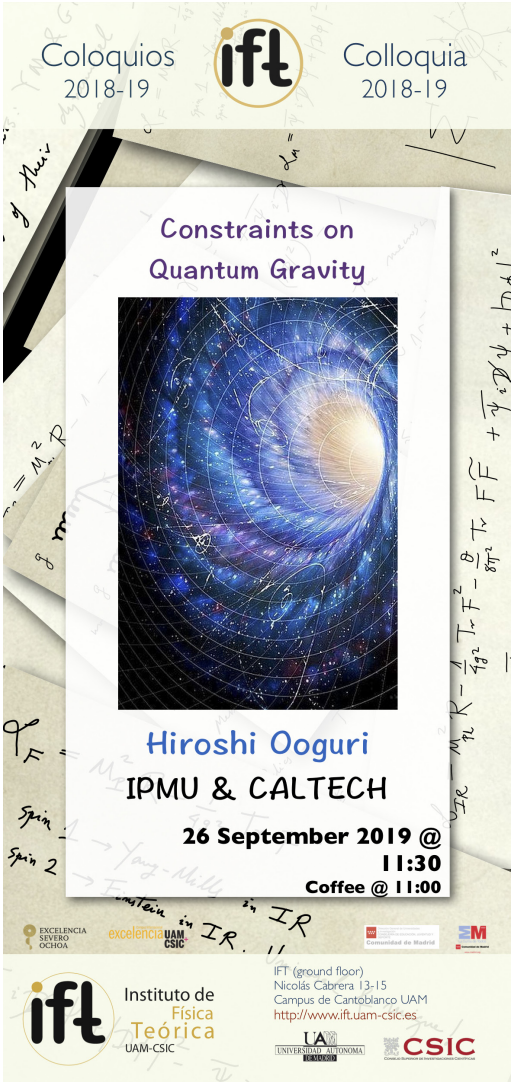
June 27th 2019
Rocky Kolb
The University of Chicago
Schrödinger's Alarming Phenomenon



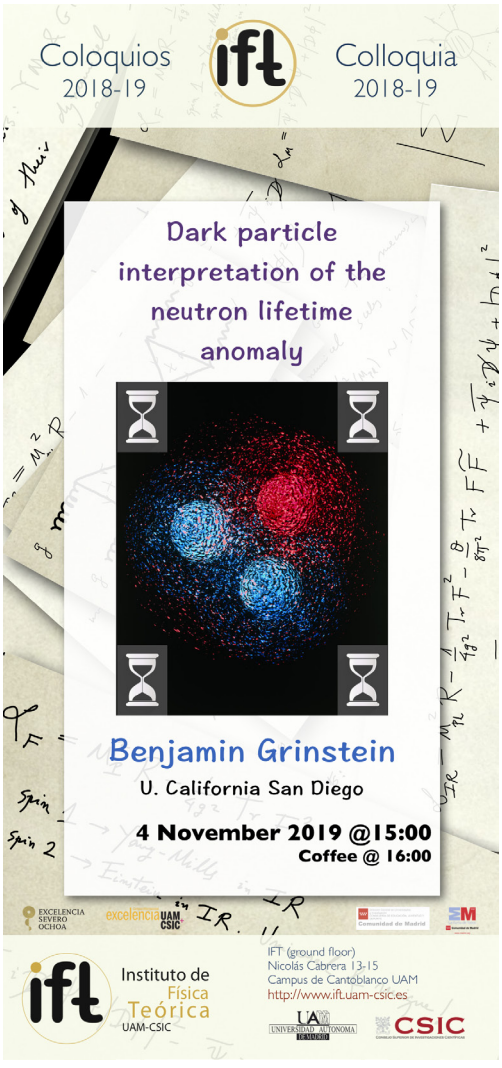


Coloquios/ Colloquia

September 26th 2019
Hiroshi Ooguri
IPMU & Caltech
Constraints on Quantum Gravity

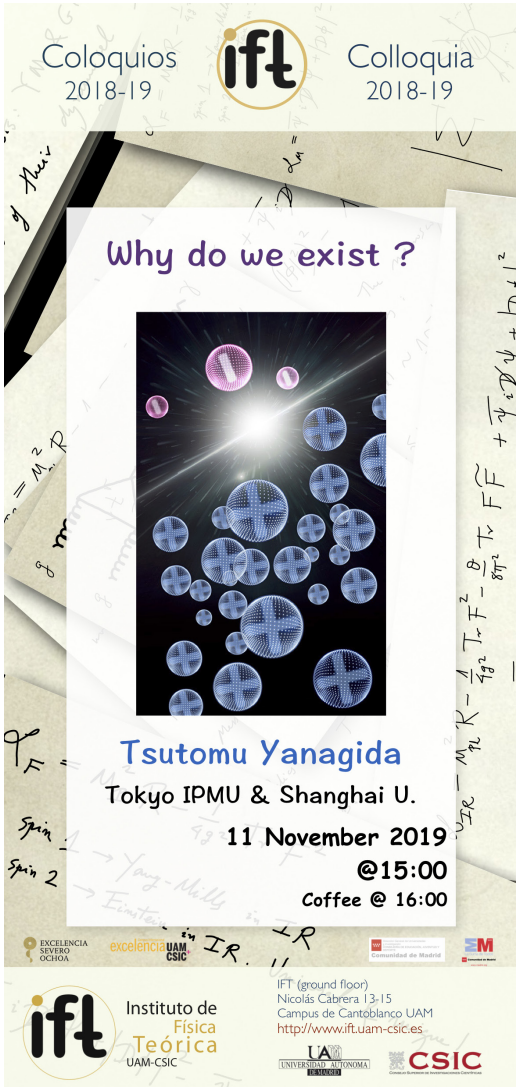


November 4th 2019
Benjamin Grinstein
U. California San Diego
Dark Particle Interpretation of the Neutron Lifetime Anomaly

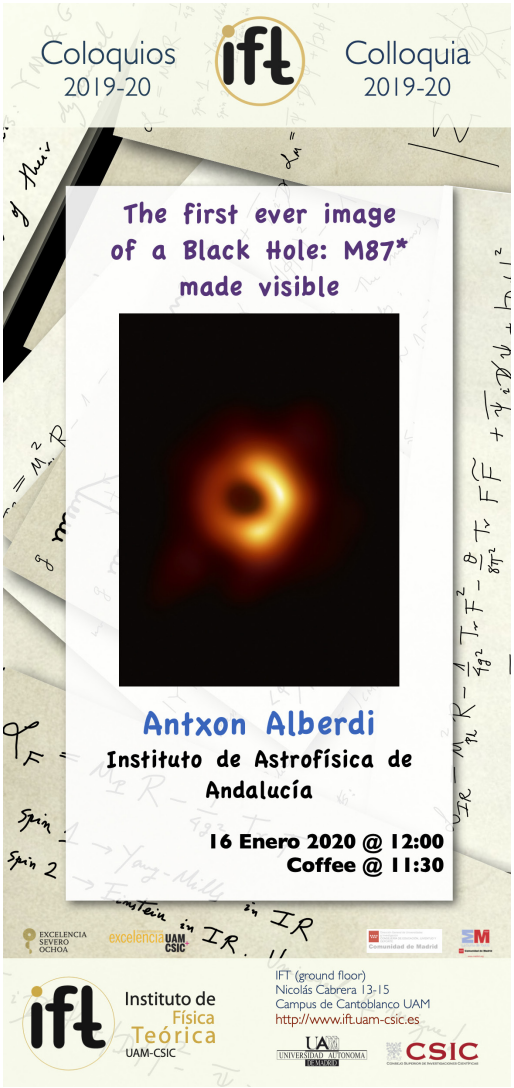


Coloquios/ Colloquia

November 11th 2019
T.T. Yanagida
IPMU Tokyo and Shangai U.
Why do we exist?



January 16th 2020
Antxon Alberdi
IAA
The first ever image of a Black Hole: M87* made visible



Seminarios 2019/ Seminars 2019

1. January 10th, 2019,
Dark Matter Hurricane,
Ciaran O'Hare (U. of Zaragoza)

2. January 21st 2019,
Testable scenarios for the origin of neutrino masses & baryon asymmetry,
J. López Pavón (IFT & IFIC)

3. January 24th 2019,
What we have learnt, are currently learning and will learn about the Neutrino Sector from nu_e disappearance experiments,
Stephen J. Parke (Fermilab)

4. January 28th 2019,
Exploring fundamental physics with gravitational waves,
Alfredo Urbano (SISSA)

5. January 31st 2019,
Meson interactions at Large Nc from Lattice QCD,
Fernando Romero López (IFIC, Valencia)

6. February 4th 2019,
Beyond the standard QCD axion cosmology,
Fabrizio Rompineve (IFAE, Barcelona)

7. February 11th 2019,
Circuit complexity for (euclidean) path-integral optimization,
Michal Heller (Albert Einstein Instute, Postdam)

8. February 18th 2019,
Missing energy signal at the LHC,
Ulrich Haisch (MPI Munich)

9. February 21st 2019,
Neutrino and Dark Matter connection from spontaneous lepton number violation,
Roberto Lineros (Univ. Catolica del Norte, Chile)

10. February 25th 2019,
Overview on Machine Learning,
Bryan Zaldívar (IFT)

11. February 28th 2019,
Learning from the machine: unsupervised tagging,
Jernej F. Kamenik (Jozef Stefan Institute, Ljubljana)

12. March 4th, 2019,
Astronomical searches for primordial black holes,
Daniele Gaggero (IFT)

13. March 11th 2019, Neutrino oscillations in the standard three-neutrino framework and beyond, Mariam Tórtola (IFIC Valencia)

14. March 14th 2019,
Emergence and the Swampland,
Eran Palti (Max-Planck-Institut für Physik, Munich)

15. March 18th 2019,
Natural Lepton Flavor Universality violation,
Mariano Quirós (IFAE Barcelona)

16. March 21st 2019,
Bound Dark Energy: Towards understanding the nature of the Dark Energy,
Alex de la Macorra (UNAM Mexico)

17. March 25th 2019,
Tunneling in real time,
Carlos Tamarit (Munich Tech. U)

18. March 28th 2019,
Non-relativistic limits,
Quim Gomis (U. Barcelona)

19. April 1st 2019,
Large-order NSPT for lattice gauge theories with fermions,
Luigi Del Debbio (University of Edinburgh)

20. April 8th 2019,
Theoretical Particle Physics: the challenges ahead,
Verónica Sanz (U. Sussex)

21. April 25th 2019,
Anomalous Supersymmetry,
Kostas Skenderis (U. Southampton)

22. April 29th 2019,
The cosmic microwave background, dark matter and other stories,
Costas Skordis (Institute of Physics, Czech Academy of Sciences)

23. May 6th 2019,
The LHC's impact on the global electroweak fit,
R. Kogler (DESY)

24. May 9th 2019,
Threshold and abundance of primordial black holes: dependence on the profile of the cosmological perturbations,
Ilia Musco (U. Barcelona)

25. May 13th 2019,
Exotic Compact Objects in Ricci-Based Gravity Theories,
Gonzalo Olmo (IFIC Valencia)

26. May 14th 2019,
A Tower Weak Gravity Conjecture from Infrared Consistency,
Stefano Andriolo (HKUST, Hong Kong)

27. May 20th 2019,
Hadronic vacuum polarization contribution to the muon magnetic moment from lattice QCD,
Laurent Lellouch (CNRS & Aix-Marseille U.)

28. May 23rd 2019,
Super-cool dark matter,
Tomas Hambye (Universite Libre de Bruxelles)

29. May 27th 2019,
Infinite tensor networks for (1+1)d quantum field theories: lattice QED and chiral ladders,
Roman Orus (Donostia International Physics Center)

30. May 28th 2019,
Are there tensor models in higher dimensions?,
Shiroman Prakash (Dayalbagh Educational Inst, Agra)

31. May 30th 2019,
Dark pion DM : WIMP vs. SIMP ?,
Pyungwon Ko (KIAS Seoul)

32. June 3rd 2019,
LHC friendly avenues for freeze-in dark matter,
José Miguel No (IFT)

33. June 7th 2019,
Model independent reconstruction of Stochastic Gravitational Wave Backgrounds at LISA,
Mauro Pieroni (IFT)

34. June 10th 2019,
Positivity in the cosmos,
Mario Herrero-Valea (EPFL Lausanne)

35. September 5th 2019,
Computing isospin breaking corrections in massive QED on the lattice,
Andrea Bussone (IFT)

36. September 16th 2019,
Irreversibility of the RG flow in quantum field theories with boundaries,
Ignacio Salazar Landea (Instituto de Física La Plata)

37. September 23td 2019,
Electron Hydrodynamics & Black Holes in Anti de Sitter Space-time,
Rene Meyer (U. Wurzwurg)

38. September 30th 2019,
A New Prospect for Discovering Heavy Neutrinos at the LHC,
Richard Efrain Ruiz (KU Leuven)

39. October 7th 2019,
From generalized global symmetries to pulsar magnetospheres,
N. Iqbal (U. Durham)

40. October 14th 2019,
Migdal Effect in Dark Matter Direct Detection Experiments and Its Applications,
Masahiro Ibe (Tokyo U.)

41. October 28th 2019,
Aspects of neutrino masses in scalar extensions of the SM,
Filipe Joaquim (Instituto Superior Técnico, U. Lisboa)

42. October 29th 2019,
Black hole remnants,
Viatcheslav Mukhanov (Arnold Sommerfeld Institute LMU Munich)

43. October 31st 2019,
The chiral qubit: quantum computing with chiral anomaly,
D. Kharzeev (Stony Brook)

44. November 5th 2019,
A new solution to the strong CP problem without the axion,
T.T. Yanagida (IPMU Tokyo and Shanghai U.)

45. November 7th,
Properties of the eta and eta-prime mesons,
Sara Collins (U. Regensburg)

46. November 12th 2019,
Strong first-order phase transitions: Vorticity, droplets and gravitational waves,
Daniel Cutting (Sussex U)

47. November 14th 2019,
Instability of the Luttinger liquids towards a fractal phase,
Huan-Qiang Zhou (Chongqing University, China)

48. November 18th 2019,
Inconsistency of an inflationary sector coupled only (minimally) to gravity,
Daniel Figueroa (IFIC Valencia)

49. November 19th 2019,
Black holes with Sol horizon,
Federico Faedo (Universita degli Studi de Milano)

50. November 21st 2019,
Chiral Metric Hydrodynamics, Kelvin Circulation Theorem, and the Fractional Quantum Hall Effect,
Dam Thanh Son (University of Chicago)

51. November 25th 2019,
Neutrino Oscillations in Dark Matter,
Eung Jin Chun (KIAS, Korea)

52. November 26th 2019,
Cosmology in the Machine Learning Era,
Francisco Villaescusa-Navarro (Princeton U.)

53. November 28th 2019,
The Dark Matter distribution of the Milky Way,
Fabio Iocco (ICTP-SAIFR)

54. December 2nd 2019,
Violation of horizon by topological quantum excitations,
Spyros Sotiaridis (University of Ljubljana)

55. December 3rd 2019,
Hydrodynamics, Spontaneously Broken Symmetries, and Holography,
Sean Gray (University of Jena)

56. December 5th 2019,
Electroweak corrections in fermionic decays of heavy Higgs bosons,
Florian Domingo (Bonn Univ.)

Seminarios 2020/ Seminars 2020

Due to the COVD19 pandemic, seminars after mid-March took place online.
Videos are available in the IFT Webinar Youtube channel-https://www.youtube.com/channel/UCcdmQRtxk_xdpt9i-FATTDQQ

1. January 13th 2020,
   Heavy Dynamical Axions,
   Rachel Houtz (IFT)
2. January 20th 2020,
   Do We Understand the Universe?,
   Raúl Jiménez (ICC, University of Barcelona)
3. January 21st 2020,
   Post-Newtonian expansions of relativistic symmetries,
   Patricio Salgado-Rebolledo (Pontificia Universidad Catolica de Valparaiso, Chile)
4. January 23rd 2020,
   Fluxes, Twisted Theory and U(1) symmetries of the Supermembrane,
   Maria Pilar Garcia del Moral (U. Antofagasta, Chile)
5. January 27th 2020,
   Cosmic optics,
   Pierre Fleury (IFT)
6. February 3rd 2020,
   Gravitational waves: A new window to observe the Universe,
   Sachiko Kuroyanagi (IFT)
7. February 6th 2020,
   Hunting for dark matter subhalos in the Milky Way with machine learning techniques,
   Mihael Petač (Montpellier Univ.)
8. February 7th 2020,
   Global aspects of moduli spaces of 2d SCFTs, the Bagger-Witten line bundle, and the swampland,
   Eric Sharpe (Virginia Tech)
9. February 10th 2020,
   High precision predictions for e+e- Colliders,
   Jürgen Reuter (DESY)
10. February 17th 2020,
    Non-metallic ground states from holography: features and observables,
    Alexander Krikun (Nordita)
11. February 20th 2020,
    New physics in rare decays,
    Toshihiko Ota (IFT)
12. February 27th 2020,
    Validity of the EFT approach to LHC processes with wide range of energies probed. The Same-Sign WW case,
    Pawel Kozow (Granada U.)
13. March 2nd 2020,
    From agnostic to believer: model independent reconstruction of non standard cosmological models and the role of theoretical priors,
    Matteo Martinelli (IFT)
14. April 20th 2020,
    Odd transport in Flatland,
    Carlos Hoyos (Oviedo U.)
15. April 23rd 2020,
    The killer apps of AdS/CMT,
    Jan Zaanen (Leiden U.)
16. April 23rd 2020,
    Cosmology from the first Stars,
    Julian Muñoz (Harvard U.)
17. April 24th 2020,
    Intertwined orders and fermionic spectral functions in holography,
    Li Li (ITP-CAS)
18. April 29th 2020,
    The effects of disorder in inflationary perturbations,
    Marcos G. Garcia (IFT)
19. May 1st 2020,
    Hydrodynamic Fluctuations,
    Luca Delacretaz (U. of Chicago)
20. May 8th 2020,
    Transport in Quantum Critical Superfluids,
    Eric Mefford (Ecole Polytechnique)
21. May 8th 2020,
    New Physics Beyond The Standard Models,
    Mathias Pierre (IFT)
22. May 12th 2020,
    SYK Thermodynamics from a Condensed Matter perspective,
    Chandan Setty (U. Florida)

23. May 18th 2020,
Detecting Light Dark Matter with atomic clocks and magnetometers,
Diego Blas (King's College)

24. May 19th 2020,
Transport and Chaos in Holographic Theories,
Richard Davison (Heriot-Watt U.)

25. May 21st 2020,
Part 1 on inflationary gravity waves from gauge fields,
Evangelos Sfakianakis (Leiden U.)

26. May 21st 2020,
Part 2 on inflationary gravity waves from gauge fields,
Evangelos Sfakianakis (Leiden U.)

27. May 25th 2020,
A Swampland Tour, from axions to global symmetries,
Matthew Reece (U. Harvard)

28. May 28th 2020,
Averaging cosmological observables in LSS surveys,
Giuseppe Fanizza (U. Lisbon)

29. June 3rd 2020,
Bubbles of Nothing in String Theory,
Iñaki García-Etxebarria (U. Durham), Irene Valenzuela, Miguel Montero (Harvard U.), Kepa Sousa (Prague)

30. June 5th 2020,
Antiproton flux and dark matter,
Pedro de la Torre (INFN)

31. June 9th 2020,
Models of Black Holes as Information Mirrors,
Ayan Mukhopadhyay (U. Madras, India)

32. June 11th 2020,
Reflected Entropy, Symmetries and Free Fermions,
Pablo Bueno (Bariloche)

33. June 15th 2020,
"Per aspera ad astra" or Precision SM Predictions & New Physics,
Alexander Lenz (U. Durham)

34. June 16th 2020,
The Holography of the Spin Current,
U. Gürsoy (U. Utrecht)

35. June 24th 2020,
Holography and Non-relativistic RG flows,
S. Cremonini (U. Lehigh)

36. June 29th 2020,
How to see new physics hidden in the proton PDFs,
Maria Ubiali (DAMTP, Cambridge)

37. June 30th 2020,
Effective Theories for Chaotic CFTs,
Moshe Rozali (Vacouver U.)

38. July 6th 2020,
Neutrino masses and LHC,
Seyda Ipek (U.C. Irvine)

39. July 14th 2020,
Coherent and incoherent transport in holographic models,
A. Krikun (Nordita)

40. July 22nd 2020,
Superluminal chaos after a quantum quench,
Kevin Nguyen (Harvard)

41. July 29th 2020,
Complexity and Conformal Field Theory,
Mario Flory (Jagellonian U.)

42. September 5th 2020,
The Dynamics of Fluids Without Boost Symmetries,
Jelle Hartong (U. Edinburg)

43. September 11th 2020,
Diffusion in a Magnetic Field,
Danny Brattan (U. Genova)

44. September 14th 2020,
Microscopic Black Holes Searches,
Ningqiang Song (Queen's U. Canada)

45. September 17th 2020,
Hydrodynamics Off Equilibrium,
Paul Romatschke (U. Colorado Boulder)

46. September 23rd 2020,
Holographic QCD and Gravitational Waves,
Aldo Cotrone (Firenze)

47. September 28th 2020,
Non-universality of Hydrodynamics,
Akash Jain (U. Victoria)

48. September 30th 2020,
How Right Was Landau?,
John McGreevy (UCSD)

49. October 7th 2020,
The Complex Life of Hydrodynamic Modes,
Andrei Starinets (Oxford U.)

50. October 8th 2020,
The Time Evolution of Cosmological Correlators,
Sebastian Cespedes (IFT)

51. October 16th 2020,
Unmasking PT Symmetry,
Carl Bender (U. Washington)

52. October 22nd 2020,
Gradient effects on false vacuum decay in gauge theory,
Juan S. Cruz (Munich Tech U.)

53. October 26th 2020,
Aharonov-Bohm in the Sky : A CMB Millikan Experiment with Cosmic Axiverse Strings,
Anson Hook (Maryland U.)

54. October 27th 2020,
Gravitational Turbulence in large D,
Christiana Pantelidou (Trinity, Dublin)

55. October 29th 2020,
Effective Field Theories (for) Matters,
Matteo Baggioli (IFT)

56. November 3rd 2020,
Holography, hydrodynamics and condensed matter experiments,
Andrea Amoretti (U. Genova)

57. November 5th 2020,
Probing new physics at the precision frontier,
Yotam Soreq (Technion)

58. November 11th 2020,
A general map from Navier-Stokes to Maxwell via Einstein,
Cindy Keeler (Arizona State U.)

59. November 12th 2020,
Primordial black holes from metric preheating: mass fraction in the excursion-set approach,
Pierre Auclair (Universite de Paris, CNRS)

60. November 16th 2020,
Indirect search for New Physics: precision measurements and EFT,
Pier Paolo Giardino (IGFAE)

61. November 18th 2020,
On whether the hydrodynamics series converges or not,
Benjamin Withers (U. Southampton)

62. November 23rd 2020,
QCD3 and Conformal Field Theory,
Rajamani Narayanan (U. Florida)

63. November 25th 2020,
Topological modes in hydrodynamics,
Yawen Sun (UCAS Beijing)

64. November 26th 2020,
Tensor Networks for 2+1 dimensional Gauge Theories,
Daniel Robaina (MPIQO-Munich)

65. November 27th 2020,
Analytic properties of the effective field theory of hydrodynamics,
Ashish Shukla (Perimeter I.)

66. December 3rd 2020,
Charting the Vacuum Landscape in SUSY benchmark scenarios,
W.G. Hollik (KIT Karlsruhe)

67. December 9th 2020,
The Entropy Current for Higher-Derivative Theories of Gravity,
S. Bhattacharyya (NISER, India)

68. December 10th 2020,
Scalar taus at the LHC: How we will find them,
Victor Martin-Lozano (DESY)

69. December 15th 2020,
The holography of the quark-gluon plasma: the next decade,
J. Noronha (U. Illinois)

70. December 21st 2020,
Dark Matter Constraints with Milky Way Stellar Dynamics,
Francesco Montanari (IFT)

71. December 21st 2020,
Indirect Detection of (multi)TeV Dark Matter: Recent Results and New Goals,
Viviana Gammaldi (IFT)

72. December 22nd 2020,
Second Sound and Non-equilibrium QFT,
Michael Landry (U. Columbia)

Foros de discusión / Journal clubs

- SPLE Club: Centrado en temas de Fenomenología de teoría de cuerdas. Martes alternos a las 11,30h.

- Holoclub: Discusión en temas relacionados con dualidades holográficas. Martes alternos a las 11,30h.

Cosmo-Grav Club: Centrado en temas de Cosmología teórica y teorías de Gravedad. Jueves a las 11h.

- PhenoCoffee Club: Para investigadores en fenomenología de Física de Partículas más allá del Modelo Estándar y Materia Oscura. Viernes a las 11,30h.

- PhD Forum: Organizado por los estudiantes de Doctorado para presentar sus proyectos de investigación.

- SPLE Club: For researchers interested in aspects of String Phenomenology. Every two Tuesdays at 11,30h.

- Holoclub: For researchers interested in aspects of Holography in String Theory. Every two Tuesdays at 11,30h.

- Cosmo-Grav Journal Club: Focused on topics of theoretical Cosmology and theories of Gravity. Thursdays at 11h.

- PhenoCoffee Club: For researchers interested in particle physics phenomenology beyond the Standard Model, and Dark Matter. Every Friday at 11,30h.

- PhD Forum: Organized by PhD students to explain each other their current research projects.

Seminarios virtuales de "Invisibles" / "Invisibles" Webinars

1. This is a series of seminars which were taking place online even before the COVID19 pandemic.

2. Feburary 12th 2019,
Dark Neutrino and Explanation of MiniBooNE Anomaly Under Siege,
Carlos Argüelles Delgado (MIT)

3. March 12th 2019,
New results on the sub-GeV Dark Matter Frontier,
Tien-Tien Yu (University of Oregon)

4. March 26th 2019,
The Neutrino Puzzle: Anomalies, Interactions, and Cosmological Tensions,
Francis-Yan Cyr-Racine (University of Harvard)

5. April 9th 2019,
How to relax the cosmological neutrino mass bound,
Isabel M. Oldengott (Universitat de Valencia and IFIC)

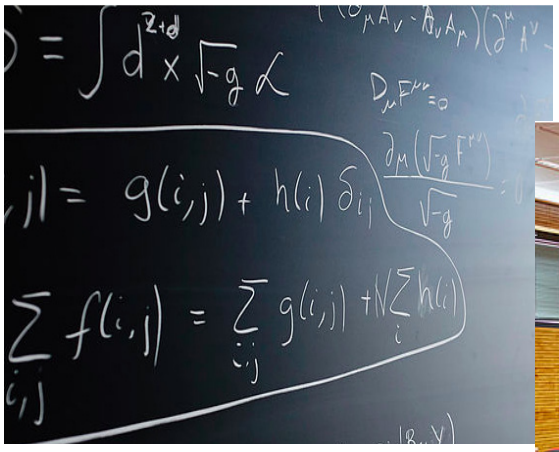
6. April 23rd 2019,
Linking lepton number violation with B anomalies,
Thomas Mannel and Oscar Catà (Siegen University)

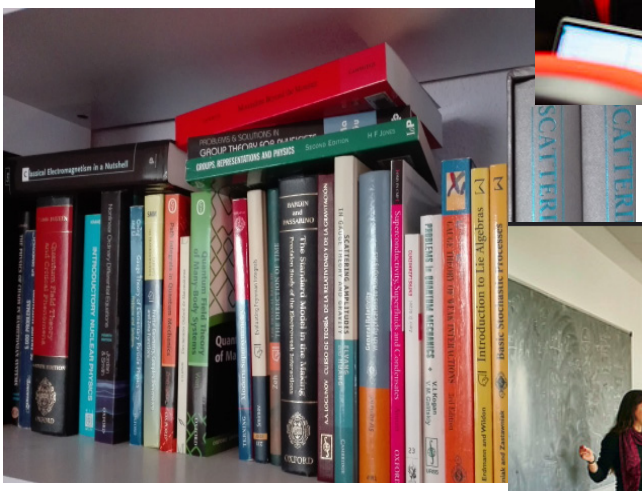
7. May 7th 2019,
High-Energy Neutrino Observatories Beyond the Standard Model,
Derek B. Fox (Penn State University)

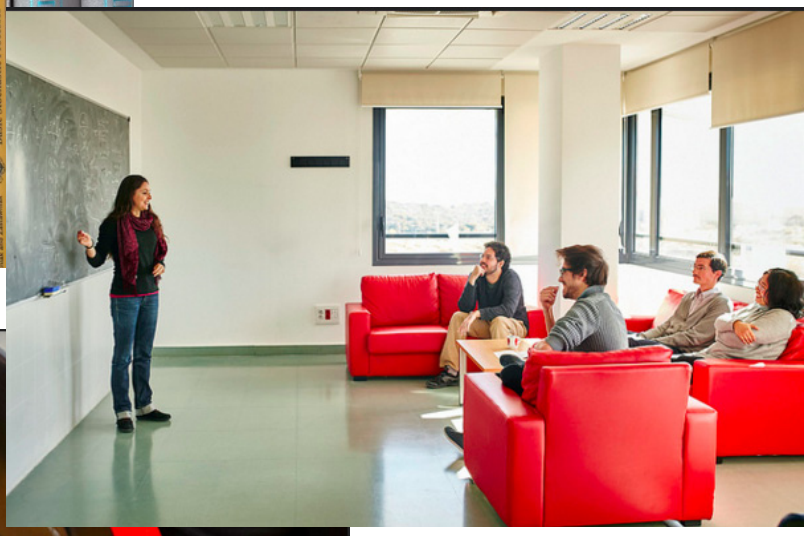
8. May 28th 2019,
Dark and shiny dresses around primordial black holes,
Daniele Gaggero (IFT)

13

Actividades de formación
Training Activities







PROGRAMA OFICIAL DE POSGRADO EN FÍSICA TEÓRICA/POST-GRADUATE PROGRAM ON THEORETICAL PHYSICS

El IFT en combinación con el Departamento de Física Teórica de la Universidad Autónoma de Madrid ofrecen un programa de Posgrado de gran calidad y de reconocido prestigio. Incluye el Máster en Física Teórica y los estudios de Doctorado.

El programa de Máster, impartido íntegramente en inglés, es de 60 créditos ECTS. Su objetivo es proporcionar una base sólida para los futuros estudiantes de Doctorado, así como dotar de habilidades de utilidad para otras carreras profesionales. El programa incluye la iniciación a la investigación con la realización de Tesis de Máster, supervisadas por miembros del IFT.

Cada año se admiten unos 30 estudiantes al Máster del IFT, con una importante fracción de extranjeros. Cada año se matriculan un promedio de 5 estuidantes europeos en el marco del programa Erasmus.

El programa de Máster disfruta de varios reconocimientos de Excelencia y Menciones de Calidad, por parte del Ministerio de Educación y del Campus de Excelencia Internacional. Está clasificado entre los mejores por el Centro de Desarrollo de Educación Superior (CHE).

El IFT también participa en el programa de Doctorado, en Física Teórica de la UAM, realizando un importante esfuerzo en la formación de jóvenes investigadores a través de la supervisión de tesis doctorales. En el IFT hay aproximadamente 50 estudiantes doctorales, que contribuyen a su ambiente jóven y dinámico. La formación en el IFT es competitiva a nivel internacional, y permite el acceso a puestos postdoctorales en centros de prestigio, o al mercado laboral en compañías líderes en los sectores tecnológicos, informáticos o financieros.

The IFT, together with the Department of Theoretical Physics at the Autonomous University of Madrid, offers a Posgraduate programa of highest quality and recognition. It includes the Master and Ph.D. studies in Theoretical Physics.

The IFT runs an English-taught one-year 60 ECTS M.Sc. degree that aims at providing a solid foundation for prospective PhD students in theoretical physics, as well as valuable skills for other careers. It includes a Master Thesis, supervised by IFT members, as initiation to research.

The number of M.Sc. students per academic year is about 30, a large fraction of them being foreigners, either European or overseas. We also have around 5 European Erasmus students each year which attend some of the lectures.

The program has obtained several excellence awards from the Spanish Ministry of Education and from the Campus of International Excellence UAM+CSIC. It has been ranked among the top Excellence Groups in Physics by the Centre for Higher Education Development (CHE).

The IFT also contributes to the UAM PhD program in Theoretical Physics. We make a strong effort on training young researchers, supervising a substantial number of PhD theses. In fact, the IFT hosts a stable population of around 50 PhD students, which contribute to its young and dynamic atmosphere. Training at the IFT is of highest quatily, and allows our PhD students to obtain postdoctoral positions at top research centers, world-wide, or access the job market in leading companies in the technological, software or finance sectors.

Entidades organizadoras/Organizing institutions:
Universidad Autónoma de Madrid (UAM) www.uam.es
Instituto de Física Teórica/ Institute of Theoretical Physics (IFT/UAM-CSIC)
Coordinadora/Coordinator: Agustín Sabio Vera (IFT-UAM/CSIC & Dpt. Theoretical Physics UAM)
Secretaría/Secretariat: Anette Knebe (Dpt. Theoretical Physics UAM)

Tesis de máster 2019

Master Thesis 2019

1. "Strong CP Problem and invisible Axions"
   Cristian Alarcón Flores [with Belén Gavela & Pablo Quilez]
2. "Hawking radiation via Gauge and Gravitational Anomalies"
   Marcos Muñiz [with Karl Landsteiner]
3. "Generalizations and physical realizations of the toric code model'"
   Alberto Megías Fernández [with Belén Paredes]
4. "MSSM vs. hMSSM: theoretical consistency of SUSY models"
   Enrique Fraile [with Sven Heinemeyer]
5. "Axion and ALP couplings at quantum level"
   Jesús Bonilla [with Belén Gavela & Pablo Quilez]
6. "Holographic Renormalisation Group Flows"
   Sergio Morales Tejera [with Óscar Varela]
7. "String Theory and the Swampland"
   Martín de la Rosa Díaz [with Fernando Marchesano]
8. "The case against galaxy bimodality. A study on galaxy populations based on color distributions"
   Pablo Corcho Caballero [with Yago Ascasibar]
9. "Data Driven Flavour Model and its scalar potenial"
   José Manuel Cano Molina [with Luca Merlo]
10. "T-Tbar Deformations of two-dimensional Quantum Field Theories"
    Miguel Gallego [with Ritam Sinha]
11. "Sensitivity to anomalous Higgs couplings via WW --> HH at e+e- colliders"
    Manuel González [with María José Herrero]
12. "The Three Qubit Flip Code: An IBM Q Experience"
    José María Rodríguez Gómez [with Esperanza López & Germán Sierra]
13. "Resource Theories"
    Daniel Varela [with German Sierra]
14. "Holografía e información cuántica"
    Nelson Hernández Rodríguez [Esperanza López]
15. "Maximally Extended Schwarzschild Metric in Unimodular Gravity"
    Asier Alonso [with Enrique Álvarez]
16. "The problem with unresolved DM halos in N-body cosmological simulations: a method for extending the halo mass function range"
    Guillermo Reyes [with Gustavo Yepes & Sergio Rodriguez Torres]

Tesis de máster 2020

Master Thesis 2020

1. "Cosmology with the Square Kilometre Array"
   Bernhard Vos [with Santiago Avila]
2. "Black holes and quantum information'"
   Gerardo García Moreno [with José Barbón]
3. "Heavy-flavoured meson decay in Lattice QCD'"
   Diego Fernández de la Pradilla [with Carlos Pena]
4. "Quantum computing with the chiral anomaly"
   Guillermo González García [with Karl Landsteiner]
5. "Swampland Conjectures and Quantum Error Correction in Holography"
   Carlos Vega García [with Ángel Uranga]
6. "The Higgs boson and the early Universe"
   David Alonso González [with José Miguel No]
7. "CP Violation in the Minimal Linear Sigma Model"
   Victor Martínez Fernández [with Luca Merlo]
8. "F-theory and the Swampland"
   Cristian Risco González [with Fernando Marchesano & Pierre Corvilain]
9. "Swampland Conjectures and Quantum Corrections"
   Juan Escudero Pedrosa [with Fernando Marchesano]
10. "Populating low resolution N-body cosmological simulations with lower mass halos"
    Julia Ferrer Ereza [with Ángeles Moliné]
11. "Probes of Higgs self-interactions with future colliders"
    Paula Martínez Suárez [with María José Herrero & José Miguel No]
12. "An unconventional axion"
    Víctor Enguita Vileta [with Belén Gavela]
13. "Quantum computation of Knot and links polynomials"
    David Martínez Crespo [with German Sierra]
14. "Estimación de la tasa de fusión de una población de agujeros negros primordiales en función del redshift y perspectivas de detección con LIGO y Einstein Telescope"
    Tania Franco Muñoz [with Daniele Gaggero]
15. "TBA"
    Álvaro Piris Cuiza [with Juan García-Bellido]
16. "Hole spin qubits in quantum dots"
    David Fernández Fernández [with Gloria Platero Coello & German Sierra]
17. "A solution to the neutrino mass problem"
    Alejandro Sopena González [with Carlos Muñoz]

Tesis doctorales 2019-2020

PhD Thesis 2019-2020

1. Theoretical and observational aspects of the variation of fundamental constants of Nature
   Franco Albareti
   January 14th 2019

2. Probing the electroweak sector of the μνSSM at the LHC
   Iñaki Lara
   January 22nd 2019

3. Next-to-simplified dark matter models
   Javier Quilis
   Februay 21st 2019

4. Aspects of T-branes
   Sebastian Schwieger
   March 14th 2019

5. Type IIA flux vacua with mobile D6-branes and alpha'-corrections
   Dagoberto Escobar
   March 15th 2019

6. Neutrino windows to new physics
   Julia Gehrlein
   June 25th 2019

7. Holography in out of equilibrium systems and asymptotic symmetries of black holes
   Guillermo Milans del Bosch
   June 26th 2019

8. Phenomenology of the Higgs sectors of the munuSSM and the N2HDM
   Thomas Biekötter
   September 5th 2019

9. Planar Radiation Zeros and Scattering Equations in Field Theory Amplitudes
   Diego Medrano
   September 6th 2019

10. Probing the Dark Universe with Gravitational Waves
    Jose María Ezquiaga
    September 9th 2019

11. Higher-Curvature Gravity, Black Holes and Holography
    Pablo Antonio Cano
    September 19th 2019

12. D-brane instanton Backreaction and a Swampland Conjecture
    Eduardo Garcia-Valdecasas
    September 27th 2019

13. New physics signals of the electroweak chiral Lagrangian in vector boson scattering at the LHC
    Claudia Garcia
    October 15th 2019

Tesis doctorales 2019-2020

PhD Thesis 2019-2020

14. One-dimensional topological insulators in the AIII symmetry class
Carlos Garcia Velasco
October 23rd 2019

15. New dynamics in axions and flavor
Pablo Quílez
October 25th 2019

16. Anomalous Transport in Hydrodynamics and Gauge/Gravity Duality Out of Equilibrium
Jorge Fernández-Pendás
November 22nd 2019

17. Sampling the μνSSM in the light of experimental data Essodjolo Kpatcha
December 10th 2019

18. Semi-Analytical Galaxies in the MultiDark-Universe - A perspective on the evolution of the most luminous and massive galaxies throughout cosmic history
Doris Stoppacher
December 13th 2019

19. Quantum Foundation of Infrared Physics
Raoul Letschka
December 13th 2019

20. Volume (in)dependence in Yang-Mills theories
Eduardo Ibáñez Bribian
December 16th 2019

21. Study of Mesonic Observables from a Mixed Action Lattice QCD Formalism
Jose Angel Romero
April 17th 2020

22. Quantum Complexity & Holography
Javier Martín García
September 4th 2020

23. 4-Forms and Membranes: From the Flux Potential to the Swampland
Alvaro Herraez
September 11th 2020

24. 't Hooft anomalies & low energy effective actions
Christian Copetti
September 17th 2020

25. Black holes in string theory with higher-derivative corrections
Alejandro Ruipérez
September 23rd 2020


UAM Universidad Autónoma de Madrid
2018 / 19 PHD PROGRAM
IN THEORETICAL PHYSICS
CORE COURSES
LATTICE FIELD THEORY
OCTOBER - P. HERNÁNDEZ, C. PENA, A. RAMOS
ANOMALIES & DIFFERENTIAL GEOMETRY
JANUARY - M. A. VÁZQUEZ-MOZO
CONFORMAL FIELD THEORY
FEBRUARY - M. FUCHS
BEYOND THE STANDARD MODEL REVIEW
APRIL - V. SANZ
MINICOURSE ON FLAVOUR PHYSICS
MAY - A. DERY & Y. NIR
ADVANCED COURSES
SPIN GEOMETRY & SUPERSYMMETRIC MANIFOLDS
FEBRUARY - C. SHAHBAZI
CALCULATING PARTICLE REACTIONS
FEBRUARY - J. VERMASEREN
A PHYSICIST'S INTRODUCTION TO MACHINE LEARNING
MARCH - D. GORDO & B. ZALDIVAR
STRING FIELD THEORY
MARCH - M. FUCHS
QUANTUM FIELD THEORY OF TOPOLOGICAL MATERIALS
APRIL - K. LANDSTEINER
LHC EVENT SIMULATION : HARD & SOFT
APRIL - S. GIESEKE
STRING THEORY
MAY - A. URANGA
http://www.uam.es/ss/Satellite/FisicaTeorica/en/home.htm
http://www.ift.uam-csic.es/en/training
Departamento de Física Teórica
ift Instituto de Física Teórica UAM-CSIC
excelencia
UAM CSIC
EXCELENCIA SEVERO OCHOA

PhD courses 2018-19

1. Lattice Field Theory
   Pilar Hernández, Carlos Pena, Alberto Ramos
   9-25 October 2018
2. Conformal field theory
   Michael Fuchs
   19 January - 5 March 2019
3. Calculating particle reactions
   Jos Vermaseren
   4-20 February 2019
4. Spin Geometry and Supersymmetric Manifolds
   Tomás Ortín, Carlos Shahbazi
   February 2019
5. A Physicist introduction to Machine Learning
   Bryan Zaldívar, David Gordo
   February 2019
6. String field theory
   Michael Fuchs
   March 2019
7. Beyond the Standard Model Review
   Verónica Sanz
   8-12 April 2019
8. LHC Event Simulation - Hard and Soft
   Stefan Gieseke
   2-11 April 2019
9. Introduction to String theory
   Ángel Uranga
   7 May - 5 June 2019
10. Anomalies and differential geometry
    Miguel Ángel Vázquez-Mozo
    10-14 June 2019

PhD courses 2019-20 y 2020-21

1. Black hole Chemistry
   Robert Mann
   16-20 September 2019
2. Simetrías y conservación en teorías de campos
   Glenn Barnich
   14-23 October 2019
3. Effective field theories with phenomenological applications
   Ben Grinstein (UCSD)
   5-26 November 2019
4. A practical mini-course on applied holography Matteo Baggioli
   27 November - 4 December 2019
5. Introduction to FORM
   Jos Vermaseren
   10-26 February 2020
6. Practical introduction to statistics
   by Bryan Zaldivar
   4-11 March 2020
7. Practical introduction to statistics (online)
   Bryan Zaldivar
   7-13 April 2021
8. Introduction to machine learning (online)
   Bryan Zaldivar
   19 April to 5 May 2021

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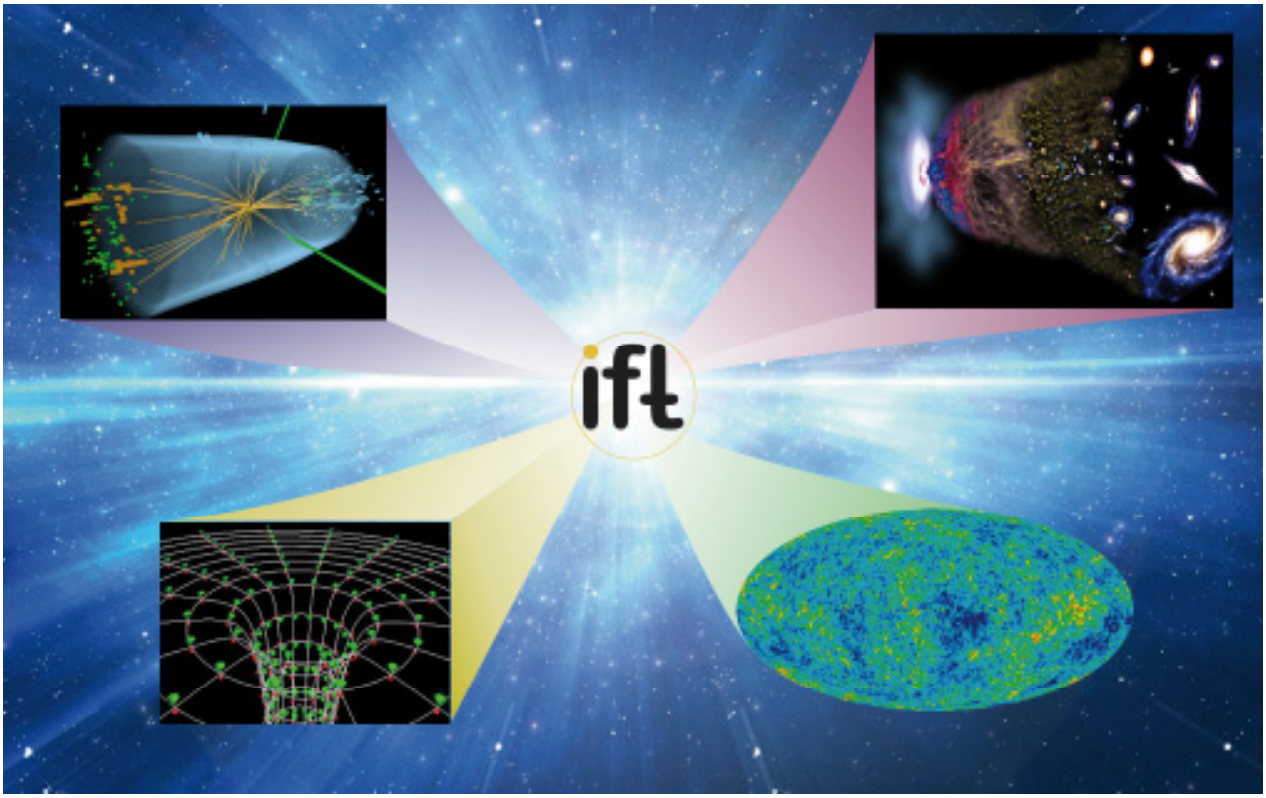
Divulgación Científica
Outreach



La divulgación de la actividad científica a la población es una tarea de enorme importancia que proporciona a la sociedad beneficios de muy variada naturaleza. Indirectamente esa comunicación aumenta la sensibilidad social hacia el interés y relevancia de la labor investigadora. Es frecuente que los países líderes en investigación y desarrollo sean a su vez aquellos en los que la población valora más el trabajo de sus investigadores.

El IFT destaca por una marcada vocación en la transmisión de conocimiento a la sociedad, a través de los medios de comunicación y de diversas actividades de divulgación científica. Éstas incluyen la organización de ciclos de conferencias, como el de la Residencia de Estudiantes iniciado en 2013 y continuado con una nueva edición.

Muchas de estas actividades están orientadas al sector de la enseñanza secundaria, como la Masterclass Internacional de Física de Partículas, los cursos para profesores de secundaria, y las decenas de charlas en centros de secundaria en el marco del programa de divulgación del CPAN.

En 2018 se ha aumentado la producción propia de vídeos divulgativos, que han dado un impulso espectacular al canal Youtube del IFT, aumentando así la visibilidad internacional del IFT, especialmente entre el sector más joven de la sociedad. Sus cifras no tienen parangón entre los centros de investigación nacionales o internacionales: más de 500.000 suscriptores y 30.000.000 de visualizciónes, a fecha de Enero 2021. El canal recibió varios premios inlcuyendo una mención honorífica en el prestigioso certamen Prismas 2018. La actividad en Youtube se complementa además con la colaboración con youtubers de divulgación científica, especialmente Quantum Fracture, con quien hemos coorganizado el evento pionero Cultube, con los youtubers líderes en divulgación cultural.

Esta intensa actividad online fue esencial durante la pandemia de COVID-19 en 2020, y permitió mantener un contacto estrecho con nuestro público durante esos meses.

The transfer of knowledge to a broader public is an enormously important task, that provides multiple benefits to society. This communication enhances the social awareness towards the interest and relevance of scientific activity. Oftentimes the leading countries in research and development are also those in which the population has a higher appreciation of the work carried on by their researchers.

The IFT stands out in its genuine interest in knowledge transfer to society through mass media and many outreach activities. These include the organization of conference series, like that in collaboration with Residencia de Estudiantes, initiated in 2013 and continued with a new edition this year.

Many of these activities are targeter to the High School education sector, like the International Masterclass on Particle Physics, High School teacher courses, and the dozens of outreach talks by IFT members at High Schools in the Madrid area, within the outreach program of CPAN.

Finally, in 2018 we have continued the production of outreach videos in the IFT Youtube channel. This initiative has enormously enhanced the statistics of this channel, and therefore the international visibility of the IFT, specially among young students. Our Youtube impact is well above other national or international research centers: over 500,000 subscribers and over 30,000,000 views, as of January 2021. Our channel received several awards including a special mention in the prestigious award Prismas 2018. Our Youtube profile is fostered by our collaboration with prestigious youtubers in scientific education, especially Quantum Fracture, with whom we coorganized the pioneering event Cultube, which gathered the top creators in scientific education in Youtube..

This intense online activity was of paramount importance during the COVI-19 pandemic in 2020, and allowed us to keep in close contact with our public.

Semana de la Ciencia/Madrid Science Week

- Conference Series "El Horizonte de la Física Fundamental Residencia de Estudiantes CSIC, Madrid Science Week 2019:

Partículas fantásticas y dónde encontrarlas: Buscando al bosón de Higgs en el LHC
José Miguel No
7 November 2019

Lo grande y lo pequeño: ¿Hay realmente diferencia?
Antonio González-Arroyo
7 November 2019

Invisibles en el Cosmos....e Invisibles en la Ciencia
Olga Mena (U. Valencia & IFIC)
8 November 2019

¿Es la gravedad una interacción fundamental?
Enrique Álvarez
8 November 2019

¿Dónde y cómo buscar a la materia oscura?
Ángeles Moliné
14 November 2019

De los lápices a las antipartículas
Ángel Uranga
14 November 2019

El Origen de la Materia Oscura
Guillermo Ballesteros
15 November 2019

Agujeros Negros en Nuestros Superconductores
Daniel Areán
15 November 2019

- "De lo infinitamente pequeño a lo infinitamente grande":

Streaming at the IFT YouTube channel
"De lo infinitamente pequeño a lo infinitamente grande"
Cosmología
7 November 2020

Streaming at the IFT YouTube channel
"De lo infinitamente pequeño a lo infinitamente grande"
El Mundo Cuántico
14 November 2020

Conferencias/ public lectures 2019

Paradojas cuánticas
Germán Sierra
Colegio Mayor Universitario Loyola, 20 March 2019

The challenge of indirect dark matter searches
Ángeles Moliné
Conference Series De Madrid al Cosmos
IEM CSIC, Madrid, 25 April 2019

El IFT, un instituto youtuber
Ángel Uranga
V Encuentro Nanodivulgadores, Madrid, 26 April 2019

Preguntas sobre la Vida, el Universo y Todo lo demás: Física de Partículas y Cosmología
Carlos Pena
Centro Cultural de Valdebernardo, 7 May 2019

Saltando al interior de un agujero negro
Javier Martín
Festival Pint of Science, Bar la Tapa, Madrid, 20 May 2019

Desvelando nuestro origen cósmico
José María Ezquiaga
Festival Pint of Science, Bar la Tapa, Madrid, 21 May 2019

El IFT, el instituto youtuber
Ángel Uranga
XVIII Jornadas profesionales: La generación de contenido autiovisual educativo y de divulgación en la red: canales, youtubers, videoblogers, Naukas,…
Fundacion Audiovisual de Andalucía, Sevilla, 4 June 2019

Qué sabemos de…. El bosón de Higgs
Alberto Casas
CSIC, Oviedo, 4 June 2019

La Estructura a Gran Escala del Universo: ecos del Big Bang-
Santiago Ávila
CEARTE, Ensenada, UNAM Mexico, 25 June 2019

Aciertos, errores y dudas de Albert Einstein
Álvaro de Rújula
Fundación Ramón Areces, Madrid, 20 November 2019

La frontera de la física fundamental
Alberto Casas,
Feria del Libro de Guadalajara, Mexico , 4 December 2019

El bosón de Higgs y el misterio de la masa
Alberto Casas,
Feria del Libro de Guadalajara, Mexico , 5 December 2019

Other public lectures

The Higgs Boson and the Coronavirus (Basic Science after the Pandemic)
Álvaro de Rújula
IFC-GBAC Green Banking Academy, 4 June 2020

Agujeros negros primordiales, materia oscura y ondas gravitacionales
Juan García-Bellido
Fundación Ramón Areces, 8 October 2020

Cómo funciona la divulgación dentro del Instituto de Física Teoría (IFT),
Susana Hernández,
U. Valencia (online) , 15 October 2020

Living at the frontier: an introduction to the holographic principle
Esperanza López I
Symposium for Physical and Chemical Sciences for Young Researchers, Murcia, 22 October 2020

Cómo montar un canal en YouTube: el caso práctico del Instituto de Física Teórica
Susana Hernández,
Curso de Cultura Científica CSIC, Madrid, 6 November 2020

Qué sabemos de … La frontera de la física fundamental
Alberto Casas
Online, 20 November 2020

Perchè la notte è scura?
Paolo Benincasa
Escola Oficial de Idiomas, Madrid, 2 December 2020

Dall'Infinitamente Grande all'Infinitamente Picoolo
Paolo Benincasa
Escola Oficial de Idiomas, Madrid, 9 December 2020

La frontera de la física fundamental
Alberto Casas
Ciencia en Primera Persona, Museo Nacional de Ciencia y Tecnología, Madrid, 13 December 2020


RETO #YoFisica
11F
#YoFisica
¿Y POR QUÉ NO?
NOBELES 2020
"La increíble ciencia detrás de los agujeros negros, Gravedad y el premio Nobel de 2020"
MARÍA JOSÉ RODRÍGUEZ (IFT, USU)
© Nobel Media. Ill. Niklas Elmehed.
11F
Coloquio online
9 de febrero 2021 - 18:30
https://projects.ift.uam-csic.es/ed/nobeles-2020/
CSIC
CBM
CIAL
CNB
ICMAT
ICMM
ICP
ICV
ifl
IMN
UAM

Actividades por la Igualdad de Género
Gender Balance Activities

Actividades 11Febrero/February 11th Activities

IFT Campaigns

#YoFisica challenge

To normalize and make visible how many women like physics we launch a challenge with the hashtag #YoFisica

Women who like physics from anywhere in the world sent their videos explaining their love for physics. They were condensed in a special video, published in 11 February 2019, featuring over 300 women, ranging from elementary school girls to reputed members the scientific community, from over a dozen countries.
Webpage: https://yofisicaift.wixsite.com/mysite/

#YoutubersPorUnDia

The IFT launched a challenge for High School students, asking them to film a video talking about leading female physicists or mathematicians. The contributions were mashed up in a special video, featuring over 100 young students from dozens of High Schools from Spain and Latin America, published at the IFT Youtube channel on 11 February 2020.

https://projects.ift.uam-csic.es/ed/youtubersporundia/

Conferences

Mujeres y hombres en el espacio:¿ que hay más alla de la Luna?
Viviana Gammaldi
Colegio de San Idelfonso, Madrid
11 February 2019

En busca de la Materia Oscura
Ángeles Moliné
Agrupación Astronómica Madrid Sur
15 February 2019

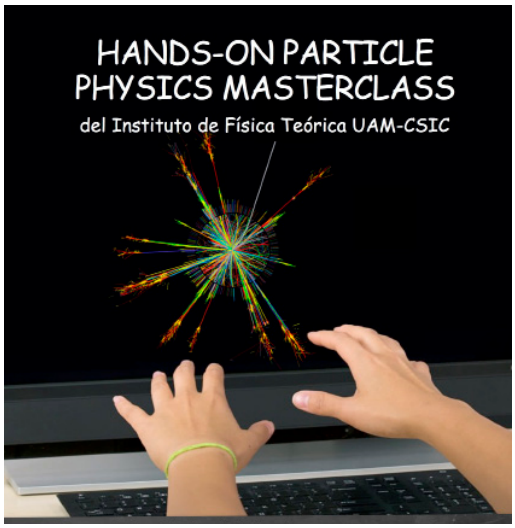
Coloquios Premios Nobel 2020 (online)

In collaboration with the CSIC centers at UAM-CSIC Excellence Campus

Webpage: projects.ift.uam-csic.es/ed/nobeles-2020

La increíble ciencia detrás de los agujeros negros, Gravedad y el premio Nobel de 2020,
María José Rodríguez (IFT, USU).
9 February 2020

Dos investigadoras premiadas con el premio Nobel de Química de 2020 como promotoras de la revolución CRISPR,
Lluís Montoliu (CNB, CSIC)
11 February 2020



ISSN 2445-3498

Divulgación en Sector Educativo

CHARLAS DE DIVULGACIÓN EN IES

The IFT tiene un programa de charlas en centros de Educación Secundaria del área de Madrid en temas de Física de Partículas y de Cosmología. En 2019-20, nuestros investigadores han impartido más de 100 charlas, con una importante participación de los estudiantes de doctorado del IFT como ponentes. Esta actividad se desarrolla en el marco del programa de divulgación del CPAN.

HANDS-ON PARTICLE PHYSICS MASTERCLASSES

En el marco de los Talleres interactivos internacionales en Física de Partículas, coordinado por el Grupo Internacional de Divulgación de Física de Partículas, que integra 85 institutiones de todo el mundo. En 2019 se organizó una sesión en el 5 de abril, con 35 estudiantes de Bachillerato:

4º ESO + EMPRESA

En el marco de este programa de la Comunidad de Madrid, un grupo de estudiantes de Secundaria de área de Madrid realizó una estancia de cuatro días en el IFT recibiendo charlas y experimentando de primera mano el ambiente de un centro de investigación. Tuvo lugar en Abril 2019.

CURSOS PARA PROFESORES DE SECUNDARIA

El IFT participa en la organización del curso preparatorio para el programa de Profesores de Secundaria en el CERN, en colaboración con la Comunidad de Madrid. La edición 2019 se celebró en las instalaciones del IFT, del 5 al 26 de Febrero, y participamos asimismo en la edición online de 2020, coorganizada con el CERN, del 28 de Enero al 18 de Febrero.

Outreach in High School Sector

OUTREACH TALKS AT HIGH SCHOOLS:

The IFT has a programme of outreach talks at High Schools in the Madrid area on topics of particle physics, cosmology. In 2019-20 our researchers delivered over 100 outreach talks. This activity is carried out mostly within the framework of the CPAN collaboration. It is also important to emphasize that it involves several of the younger IFT members, namely PhD students.

HANDS-ON PARTICLE PHYSICS MASTERCLASSES

This activity is framed within the International Hands-on Particle Physics Masterclass, which involves 85 institutions worldwide, and is coordinated by the International Particle Physics Outreach Group (IPPOG). In 2019 we organized one session on April 5th, with some 35 High School students.

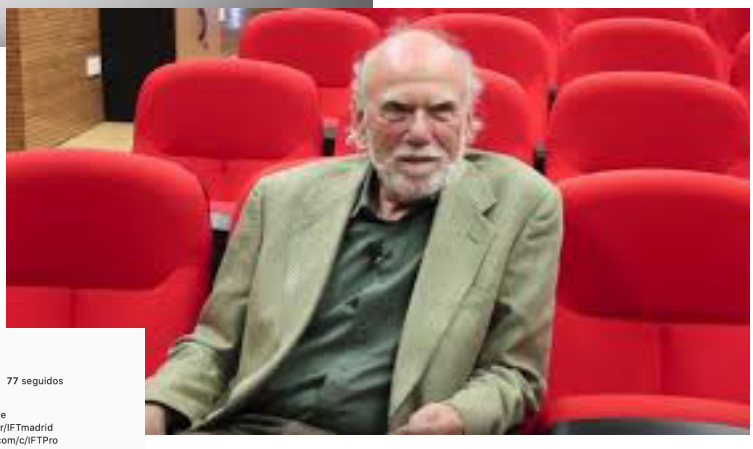
4º ESO + EMPRESA

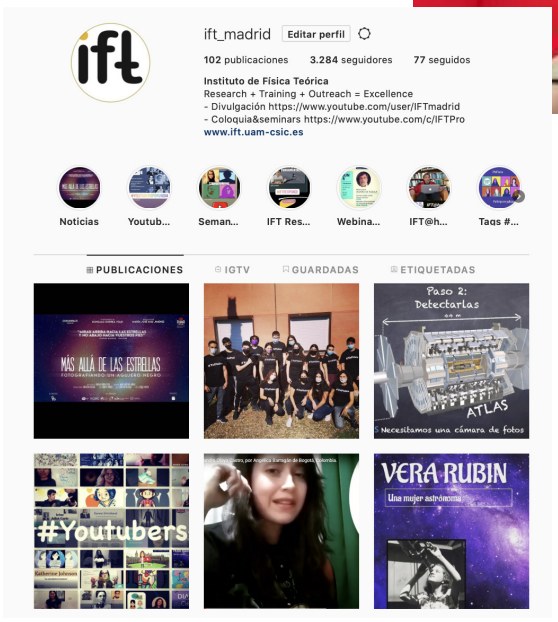
Within the program in Comunidad de Madrid, a group of students from High Schools in the Madrid area spent four days of experience at the IFT, receiving lectures and experiencing first-hand. the atmosphere of a top research center. It took place in April 2019.

HIGH SCHOOL TEACHER PROGRAMS

The IFT particpates in the preparatory course for the CERN Spanish High School Teachers Program, in collaboration with Comunidad de Madrid. It hosted the 2019 edition on 5-26 February 2019, and provided several lecturers for the online 2020 edition, coorganized with CERN, from 28 January to 18 February 2020

Redes Sociales
Social Networks





Vídeos en canal Youtube

El IFT ha aumentado enormemente su actividad en Youtube con la publicación de vídeos de las conferencias anteriores en su canal, con gran impacto y visibilidad. El canal cuenta con más de 500.000 suscriptores y supera 30.000.000 visitas.

En 2019 y 2020 hemos continuado la producción de vídeos divulgativos de elaboración propia, en una serie periódica de vídeos de respuestas a preguntas de los internautas, denominada "IFTresponde", con la publicación de más de 70 vídeos.

El canal de Youtube ha servido asimismo de apoyo a campañas especiales, especialmente de fomento del equilibrio de género en la Ciencia, como el reto #YoFisica en 2019-20 y #YoutubersPorUnDia en 2020-21 para el 11 de Febrero, Día Internacional de la Mujer y la Niña en la Ciencia.

El canal recibió varios premios en 2017, y en 2018 fue galardonado con la Mención Especial en los prestigiosos Premios Prismas 2018 de divulgación, organizado por los Museos Científicos de A Coruña.

Youtube videos

We have enormously boosted the publication of videos at the IFT Youtube channel, with a very successful number of views. Our Youtube channel has over 500.000 suscribers and over 30.000.000 views.

In 2018 we have continued the production of outreach videos, in a series of Q&A videos, named "IFTresponde", with the periodic publication videos answering question from the audience, with over 70 videos published in 2019-20.

Our Youtube channel has also supported special campaigns, specially to promote gender balance in Science, such as the #YoFisica challenge in 2019-20 and the #YoutubersPorUnDia challenge in 2020-21, for February 11th, the International Day of Women and Girls in Science.

Our Youtube channel has received several awards in 2017, and in 2018 it has received a Special Mention in the prestigious Prismas Awards 2018, organized by the Scientific Museums in A Coruña

Instagram

En 2020 inauguramos nuestro canal de Instagram, que en poco tiempo ha superado los 3.000 seguidores.
Síguenos en @ift_madrid

Instagram

In 2020 we launched our Instagram profile, which in a few months has surpassed 3000 followers.
Follow us at @ift_madrid

Redes Sociales
Social Networks

Concurso Ciencia Clip Latinoamérica

El IFT ha coordinado la organización del concurso Ciencia Clip Latinoamérica 2019 de vídeos divulgativos realizados por estudiantes de enseñanza secundaria de América Latina.

Ciencia Clip Latinoamérica es un proyecto del canal de Youtube Date un Voltio, coordinado por el IFT, en colaboración con el ICTP de Trieste, Universidad Nacional de Colombia, Club de Física y Sociedad de Egresados del Instituto Mejía de Quito, UEF Don Bosco de Quito, Endemol, Scenio, CERNtrípetas. Ciencia Clip es una idea original de la Cátedra de Cultura Científica de la UPV/EHU.

El concurso tuvo una participación de varios centenares de vídeos. El Premio Especial consistió en un viaje al CERN con visita al IFT a su paso por Madrid. En 2019, el IFT organizó la ceremonia de entrega del Premio Especial de la edición 2018, enmarcada en una jornada de divulgación científica con varios creadores de contenido científico en Youtube: Javier Santaolalla (Date un Voltio, Date un Vlog, Date un Mi), José Luis Crespo (Quantum Fracture), Martí Montferrer (CdeCiencia, Cogitare) y Rocío Vidal (La gata de Schrödinger). Se invitó al evento a clases de estudiantes de centros de Enseñanza Secundaria de Madrid, contándose más de 250 asistentes a la jornada.

https://projects.ift.uam-csic.es/cienciaclipLAC/

Ciencia Clip Latin America contest

The IFT participated in the organization of the contest Ciencia Clip Latinoamérica, of educational videos prepared and starred by High School students in Latin America.

Ciencia Clip Latinoamérica is an initiative by the Youtube channel Date un Voltio, coordinated by the IFT, in collaboration with theDate un Voltio, ICTP de Trieste, Universidad Nacional de Colombia, Club de Física y Sociedad de Egresados del Instituto Mejía de Quito, UEF Don Bosco de Quito, Endemol, Scenio, CERNtrípetas.. Ciencia Clip is an original idea by Scientific Culture Cathedra of UPV/EHU.

The contest gathered several hundreds of participating videos. The Special Prize was a trip to CERN with a visit to the IFT in its stop in Madrid. In 2019, the IFT organized the Special Prize Award Ceremony of the 2018 edition, within a special outreach event including extended talks by several top Youtube scientific content creators: Javier Santaolalla (Date un Voltio, Date un Vlog, Date un Mi), José Luis Crespo (Quantum Fracture), Martí Montferrer (CdeCiencia, Cogitare) y Rocío Vidal (La gata de Schrödinger). We invited High School studen classes in the Madrid area, and the event was attended by over 250 participants.

https://projects.ift.uam-csic.es/cienciaclipLAC/


DE NUEVO, LA CIENCIA
ARTE
HISTORIA
MEDICINA
CINE
BIOTECNOLOGÍA
MÚSICA
INTELIGENCIA ARTIFICAL
ESCEPTICISMO
DE YOUTUBE EN EL MISMO EVENTO
CUTUBE 2.0
LA VENGANZA
MADRID 11/10/19 18:00 EN LA CASA ENCENDIDA
ifl
El Robot de Platón
Alvinsch
La Hiperactina
QuantumFracture
Ciencia de Sofá
Ángel Uranga
Preguntas Incómodas
Jordi Maquiavello
Pedro Duque
YouTube
SizeMatters
El Cubil de Peter
Glóbulo Azul
DotCSV
EXCELENCIA SEVERO OCHOA
UAM
excelencia UAM CSIC
YouTube
<E
CSIC

Cultube 2.0: La Venganza

11/10/2019

The IFT is a world-wide leading institution in scientific outreach in Youtube. This is fostered by our inteplay with top youtubers in Science Eduaction in Spanish. In 2018, the IFT in collaboration with the prestigious Youtube creator Quantum Fracture, organized the event Cultube, enrolling 10 top Youtube creators in Education and Culture in Spanish, who gave short talks on their experience. There was also a presentation by Melanie Parejo, Youtube Manager and Responbile for Education in Spain. In 2019 we organized the second Edition, which counted with the participation of Pedro Duque, Spanish Minister of Science.

The event took place in La Casa Encendida, one of the most vibrant cultural centers in Spain. The event was attended by 200 persons, and followed online by over 5000. The video of the event has reached well over 200,000 views as of January 2021.

Organizers:
José Luis Crespo (Quantum Fracture), Angel Uranga. Secretaría: Susana Hernández, Mónica Vergel

Speakers: Pedro Duque (Minister of Science), José Luis Crespo (Quantum Fracture), Aldo Bartra (El Robot de Platón), Sabrina Tortora & Antonio Planchart (Preguntas Incómodas), Alvin Schutmaat (Alvinsch), Sandra Ortonobés (La Hiperactina), Lazlos (Glóbulo Azul), Anna Morales

Libros
Books

Disfruta de tu universo. No tienes otra opción

Spanish version of "Enjour your universe. You have no other choice", published by Oxford University Press
Álvaro de Rujula
Ed. Catarata
https://www.catarata.org/libro/disfruta-de-tu-universo-no-tienes-otra-opcion_117357/
June 2020

Ciencia. Y un gran paso para la Humanidad!!!

Featuring chapters by Claudia García García, Xabier Marcano from the IFT
Coordinated by Quintín Garrido
https://cienciayungranpasoparalahumanidad.blogspot.com
2019

Ciencia, y el "Cosmos" del siglo XXI

Featuring a chapter by José L. F. Barbón, from the IFT
Coordinated by Quintín Garrido y Alicia Parra Ruiz
https://cienciayelcosmosdelsigloxxi.blogspot.com/2020/01/ciencia-y-el-cosmos-del-siglo-xxi.html?m=1
2020

TV, radio y prensa/ TV, Radio and Newspapers

Radio & TV

- El proyecto internacional Dark Energy Survey finaliza hoy su toma de datos tras 6 años observando millones de galaxias

Radio COPE
9 January 2019
https://www.cope.es/actualidad/sociedad/noticias/proyecto-internacional-dark-energy-survey-finaliza-hoy-toma-datos-tras-anos-observando-millones-galaxias-20190109_328631

- Interview with José L. F. Barbón

Órbita Laika, La 2 RTVE
20 May 2019
http://www.rtve.es/alacarta/videos/orbita-laika/orbita-laika-invisibilidad-entrevista/5225446/

- Predicciones del Modelo Estándar de la Física de Partículas - Dr. Herdoíza -

Investigadores por el mundo, Gestiona Radio
29 May 2019
https://www.ivoox.com/predicciones-del-modelo-estandard-fisica-de-audios-mp3_rf_36466853_1.html

- ILos "influencers" más preparados

Telemadrid, Telenoticias 1 (min. 54:30)
11 October 2019
https://www.telemadrid.es/programas/telenoticias-1/Telenoticias-2-2166703388--20191011045114.html

- Cultube: Youtubers de divulgación científica

RNE
14 October 2019
http://www.rtve.es/alacarta/audios/solamente-una-vez/solamente-vez-guardia-civil-mas-famoso-guapo-ig-youtubers-divulgadores-cientificos-museo-origami-14-10-19/5409780/

- IEl congreso "Baryon and Lepton Number Violation" reúne a 150 expertos mundiales en Física de Partículas en Madrid

Onda Cero Madrid Norte
21 October 2019
https://madridnorte24horas.com/universidad-autonoma-de-madrid/31046-el-congreso-baryon-and-lepton-number-violation-reune-a-150-expertos-mundiales-en-fisica-de-particulas-en-madrid

- El Congreso Mundial de Física de Partículas reúne en Madrid a 150 expertos internacionales

Cadena Ser Madrid Norte
21 October 2019
https://cadenaser.com/emisora/2019/10/21/ser_madrid_norte/1571650553_177198.html

- 100xciencia.4: lo que la ciencia hace por ti

EITB
21 November 2019
https://www.eitb.eus/es/radio/radio-euskadi/programas/la-mecanica-del-caracol/detalle/6835551/100xciencia4-lo-ciencia-hace-ti-ruta-dolmenes/

Radio & TV

- El Cambio Climático contado por Expertos
Dr. What
21 November 2019
https://www.youtube.com/watch?v=QIgjK0-E10Y

- Interview with Raquel Santos #YoFisica
RNE "Longitud de Onda" (min 37:50)
15 January 2020
https://www.rtve.es/alacarta/audios/longitud-de-onda/longitud-onda-violinista-centra-barbada-15-01-20/5484301/

- Física Teórica en youtube
RTVE Radio 5
19 January 2020
https://www.rtve.es/alacarta/audios/red-abierta/red-abierta-fisica-teorica-youtube-19-01-20/5486640/

- La ciencia también triunfa en Youtube
Telemadrid
27 January 2020
http://www.telemadrid.es/programas/telenoticias-1/ciencia-triunfa-YouTube-2-2199100120--20200127055508.html

- La historia del universo, en 3D: descifran 11.000 millones de años en el mayor mapa cósmico jamás creado
Telecinco
21 July 2020
https://www.telecinco.es/informativos/ciencia/universo-historia-mapa_18_2982270165.html

- Interview with Angel Uranga "Tenet entre la ciencia y la ficción"
Toma la pastilla roja 2x01. Onda Cero
9 September 2020
https://www.ondacero.es/solo-ondaceroes/toma-pastilla-roja/podcast/toma-la-pastilla-roja-2x01-tenet-christopher-nolan_202009095f58f0873703420001df14d7.html

- Agujeros negros, los secretos más oscuros del universo
Onda Cero
21 October 2020
https://www.ondacero.es/solo-ondaceroes/toma-pastilla-roja/podcast/2x03-agujeros-negros-secretos-oscuros-universo_202010215f9042e63a670a0001d32ddb.html

Artículos y prensa/ Press & Newspapers

- Nos acercamos a la comprensión de la energía oscura
Tendencias21
9 January 2019
https://www.tendencias21.net/Nos-acercamos-a-la-comprension-de-la-energia-oscura_a44960.html

- El proyecto internacional Dark Energy Survey finaliza hoy su toma de datos tras 6 años observando millones de galaxias
La Vanguardia
9 January 2019
https://www.lavanguardia.com/vida/20190109/454042422569/el-proyecto-internacional-dark-energy-survey-finaliza-hoy-su-toma-de-datos-tras-6-anos-observando-millones-de-galaxias.html

- El Dark Energy Survey cartografía con un detalle sin precedentes un octavo del cielo
INNOVASPAIN
10 January 2019
https://www.innovaspain.com/el-dark-energy-survey-cartografia-con-un-detalle-sin-precedentes-un-octavo-del-cielo/

- Nos acercamos a la comprensión de la energía oscura
Madri+d
11 January 2019
https://www.madrimasd.org/notiweb/noticias/nos-acercamos-comprension-energia-oscura

- El Dark Energy Survey cartografía un octavo del cielo en busca de energía oscura
Agencia SINC
11 January 2019
https://www.agenciasinc.es/Noticias/El-Dark-Energy-Survey-cartografia-un-octavo-del-cielo-en-busca-de-energia-oscura

- Interview with José Ramón Espinosa: «Que el universo se rija por leyes matemáticas es una maravilla»
León Noticias
20 January 2019
https://www.leonoticias.com/sociedad/ciencia/jose-ramon-espinosa-20190120184036-ntrc.html

- La UAM recibe a grandes 'youtubers' científicos en un encuentro internacional
La Vanguardia
29 January 2019
https://www.lavanguardia.com/local/madrid/20190121/454224924384/la-uam-recibe-a-grandes-youtubers-cientificos-en-un-encuentro-internacional.html

- La ciencia se defiende en Youtube
Público
3 February 2019
https://www.publico.es/ciencias/ciencia-defiende-youtube.html

- La ciencia encuentra un hueco en YouTube
EFE Futuro
3 February 2019
https://www.efefuturo.com/ciencia/youtubers-ciencia/

- La decepcionante historia de los rusos que mandaron un electrón al pasado
El País
17 March 2019
https://elpais.com/elpais/2019/03/15/ciencia/1552647865_813343.html

- Interview with Alberto Casas "Si ya han descubierto el bosón de Higgs, ¿para qué sirve ahora el CERN de Ginebra?"
El Confidencial
7 April 2019
https://www.elconfidencial.com/tecnologia/ciencia/2019-04-07/alberto-casas-lhc-libro-csic_1926814/

- ¿Qué aspecto tienen los agujeros negros que veremos este miércoles por primera vez?
ABC
10 April 2019
https://www.abc.es/ciencia/abci-aspecto-tienen-agujeros-negros-veremos-primera-201904092239_noticia.html

- Agujeros negros, el misterio que nació en la pizarra de Einstein
ABC
14 April 2019
https://www.abc.es/ciencia/abci-agujeros-negros-misterio-nacio-pizarra-einstein-201904140140_noticia.html

- El eclipse que cambió la historia del universo
La Voz de Galicia
26 May 2019
https://www.lavozdegalicia.es/noticia/sociedad/2019/05/24/eclipse-importante-historia/00031558706437683821970.htm

- Interview with Álvaro de Rújula
Naukas
5 June 2019
https://naukas.com/2019/06/05/entrevista-a-alvaro-de-rujula-fisico-teorico-del-cern-y-del-ift-uam/

- Ni78: las dos caras de un núcleo doblemente mágico
UAM Gazette
5 June 2019
htts://bit.ly/3uTuLcp

- Madrid acoge un congreso de física de partículas con expertos internacionales
ABC
13 June 2019
https://agencias.abc.es/noticia.asp?noticia=3135156

- Madrid acoge un congreso de física de partículas con expertos internacionales
La Vanguardia
13 June 2019
https://www.lavanguardia.com/local/madrid/20190613/462856598774/madrid-acoge-un-congreso-de-fisica-de-particulas-con-expertos-internacionales.html

- Madrid recibe a 50 doctorandos de 30 países, centrados en la teoría cuántica
ABC
10 July 2019
https://agencias.abc.es/noticia.asp?noticia=3153980

- Madrid recibe a 50 doctorandos de 30 países, centrados en la teoría cuántica
La Vanguardia
10 July 2019
https://www.lavanguardia.com/local/madrid/20190710/463407361434/madrid-recibe-a-50-doctorandos-de-30-paises-centrados-en-la-teoria-cuantica.html

- Cien expertos de todo el mundo debatirán en Madrid sobre la teoría de cuerdas

La Vanguardia
23 September 2019
https://www.lavanguardia.com/deportes/20190923/47585821751/cien-expertos-de-todo-el-mundo-debatiran-en-madrid-sobre-la-teoria-de-cuerdas.html

- La Casa Encendida acogerá 'Cultube'

Madridpress
2 October 2019
https://madridpress.com/art/261311/la-casa-encendida-acogera-cultube

- La Casa Encendida acoge la segunda edición de Cultube, el mayor encuentro de 'youtubers' especializados en divulgación

Touristmad
3 October 2019
https://turismad.wordpress.com/2019/10/03/la-casa-encendida-acoge-la-segunda-edicion-de-cultube-el-mayor-encuentro-de-youtubers-especializados-en-divulgacion/

- El evento "Cultube 2.0 | La Venganza" reunirá en La Casa Encendida a creadores culturales de YouTube con millones de seguidores

Madrid 24horas
9 October 2019
https://madridnorte24horas.com/universidad-autonoma-de-madrid/30926-el-evento-cultube-2-0-la-venganza-reunira-en-la-casa-encendida-un-elenco-de-creadores-culturales-de-youtube-con-millones-de-seguidores

- YouTube está democratizando el acceso a la formación

Soziable
9 October 2019
https://www.soziable.es/youtube-democratizando-acceso-formacion-siglo-xxi

- El Instituto de Física Teórica organiza el evento Cultube 2.0, que reúne a divulgadores científicos de youtube

CSIC
9 October 2019
https://www.csic.es/es/actualidad-del-csic/el-instituto-de-fisica-teorica-organiza-el-evento-cultube-20-que-reune

- La UAM reúne a 'youtubers' de todo el mundo para debatir sobre redes sociales

La Vanguardia
9 October 2019
https://www.lavanguardia.com/politica/20191009/47882830810/la-uam-reune-a-youtubers-de-todo-el-mundo-para-debatir-sobre-redes-sociales.html

- 'Influencers' sobradamente preparados

El País
10 October 2019
https://elpais.com/ccaa/2019/10/10/madrid/1570715609_908835.html

- Cultube

Timeout
11 October 2019
https://www.timeout.es/madrid/es/que-hacer/cultube

- Jóvenes que triunfan divulgando ciencia en Youtube

Diario Siglo XXI
11 October 2019
http://www.diariosigloxxi.com/texto-s/mostrar/337101/jovenes-triunfan-divulgando-ciencia-youtube-nos-toman-pitorreo

- Agenda Ministro de Ciencia, Innovación y Universidades, da la bienvenida y asiste al encuentro 'Cultube 2019'
La hora digital
11 October 2019
https://lahoradigital.com/noticia/22945/la-agenda-digital/viernes-11-de-octubre-de-2019.html

- Jóvenes que triunfan divulgando ciencia en Youtube
Servimedia
13 October 2019
http://www.servimedia.es/noticias/118

- Qué hacer este fin de semana en Madrid: 11-13 de octubre
Madrid es noticia
13 October 2019
https://www.madridesnoticia.es/2019/10/fin-semana-madrid-planes-11-13/

- Planes cañeros de fin de semana
MahouMadrid
13 October 2019
https://www.mahoudrid.com/actividades-madrid/planes-fin-de-semana/

- El instrumento para explorar la materia oscura DESI realiza su primera observación
La Vanguardia
28 October 2019
https://www.lavanguardia.com/vida/20191028/471251319224/el-instrumento-para-explorar-la-materia-oscura-desi-realiza-su-primera-observacion.html

- 5.000 'ojos' para capturar los colores del cosmos
UAM
19 October 2019
https://www.uam.es/UAM/DESI_29_10/1446791835064.htm?language=es&pid=1242649910548

- DESI abre sus 5.000 ojos para capturar los colores del cosmos
Agencia SINC
29 October 2019
https://www.agenciasinc.es/Noticias/DESI-abre-sus-5.000-ojos-para-capturar-los-colores-del-universo

- 5.000 'ojos' para capturar los colores del Universo
Ideal
29 October 2019
https://www.ideal.es/sociedad/5000-ojos-capturar-20191029110425-nt.html?ref=https%3A//www.google.es/

- Una 'máquina del tiempo' para recrear el cosmos hace 11.000 millones de años
El País
10 November 2019
https://elpais.com/elpais/2019/11/05/ciencia/1572965028_529003.html

- El canal YouTube del Instituto de Física Teórica supera los 500.000 suscriptores
CSIC
13 January 2020
https://www.csic.es/es/actualidad-del-csic/el-canal-de-youtube-del-instituto-de-fisica-teorica-supera-los-500000

- El Instituto de Física Teórica de la UAM triunfa en Youtube con videos de divulgación científica
Crónica Norte
21 January 2020
https://www.cronicanorte.es/instituto-fisica-teorica-uam-triunfa-youtube-con-videos-de-divulgacion-cientifica/142821

- El CSIC celebra el Día de la Mujer y la Niña en la Ciencia con casi 150 actividades en toda España
Siglo XXI
10 February 2020
http://www.diariosigloxxi.com/texto-s/mostrar/350749/csic-celebra-dia-mujer-nina-ciencia-casi-150-actividades-toda-espana

- La ciencia con internet entra
Leonoticias
7 March 2020
https://www.leonoticias.com/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- La ciencia con internet entra
El Comercio
7 March 2020
https://www.elcomercio.es/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- La ciencia con internet entra
Hoy
7 March 2020
https://www.hoy.es/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- La ciencia con internet entra
El norte de Castilla
7 March 2020
https://www.elnortedecastilla.es/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- La ciencia con internet entra
Diario Sur
7 March 2020
https://www.diariosur.es/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- La ciencia con internet entra
El correo
7 March 2020
https://www.elcorreo.com/vivir/tendencias/divulgadores-cientificos-youtube-20200306141134-ntrc.html

- LLos astrofísicos miden la expansión del Universo a lo largo de 11.000 millones de años
Alpha Galileo
20 July 2020
https://www.alphagalileo.org/en-gb/Item-Display/ItemId/195336?returnurl=https%3A//www.alphagalileo.org/en-gb/Item-Display/ItemId/195336

- Astrofísicos miden la expansión del Universo a lo largo de 11.000 millones de años
República de las ideas
20 July 2020
https://www.republica.com/2020/07/20/astrofisicos-miden-la-expansion-del-universo-a-lo-largo-de-11-000-millones-de-anos/

- Publican el mapa 3D del universo más completo hasta ahora
La Nación
20 July 2020
https://www.lanacion.com.ar/ciencia/publican-mapa-3d-del-universo-mas-completo-nid2400665

- El mayor mapa 3D del universo jamás creado
Agencia SINC
20 July 2020
https://www.agenciasinc.es/Noticias/El-mayor-mapa-3D-del-universo-jamas-creado

- Miden la expansión del Universo a lo largo de 11.000 millones de años

Opinión
20 July 2020
https://www.opinion.com.bo/articulo/ciencia/miden-expansion-universo-largo-11000-millones-anos/20200720111850778470.html

- Miden la expansión del Universo a lo largo de 11.000 millones de años

La Vanguardia
20 July 2020
https://www.lavanguardia.com/vida/20200720/482434770072/miden-la-expansion-del-universo-a-lo-largo-de-11000-millones-de-anos.html

- Miden la expansión del Universo a lo largo de 11.000 millones de años

elDiario.es
20 July 2020
https://www.eldiario.es/tecnologia/miden-la-expansion-del-universo-a-lo-largo-de-11-000-millones-de-anos_1_6115863.html

- Los astrofísicos miden la expansión del Universo a lo largo de 11.000 millones de años

Alpha Galileo
20 July 2020
https://www.alphagalileo.org/en-gb/Item-Display/ItemId/195336?returnurl=https%3A//www.alphagalileo.org/en-gb/Item-Display/ItemId/195336

- Astrofísicos miden la expansión del Universo a lo largo de 11.000 millones de años

República de las ideas
20 July 2020
https://www.republica.com/2020/07/20/astrofisicos-miden-la-expansion-del-universo-a-lo-largo-de-11-000-millones-de-anos/

- Un nou estudi mesura l'expansió de l'univers al llarg d'11.000 milions d'anys

Diari de Girona
21 July 2020
https://www.diaridegirona.cat/cultura/2020/07/21/nou-estudi-mesura-lexpansio-lunivers/1053665.html

- Miden la expansión del Universo a lo largo de 11.000 millones de años

Agencia EFE
21 July 2020
https://www.efe.com/efe/espana/efefuturo/miden-la-expansion-del-universo-a-lo-largo-de-11-000-millones-anos/50000905-4301625

- Els astrofísics mesuren l'expansió de l'Univers al llarg d'11.000 milions d'anys

El Món
21 July 2020
https://elmon.cat/monplaneta/actualitat/astrofisics-mesuren-lexpansio-lunivers-al-d11000-milions-danys

- La expansión del Universo durante 11.000 millones de años

Ambientum
22 July 2020
https://www.ambientum.com/ambientum/ciencia/expansion-del-universo-durante-11-000-millones-de-anos.asp

- Los astrofísicos miden la expansión del Universo a lo largo de 11.000 millones de años

Aula Magna
22 July 2020
http://www.aulamagna.com.es/los-astrofisicos-miden-la-expansion-del-universo-a-lo-largo-de-11-000-millones-de-anos/

- Miden la expansión del Universo a lo largo de 11.000 millones de años
ABC en el Este
22 July 2020
https://www.abc.com.py/ciencia/2020/07/20/miden-la-expansion-del-universo-a-lo-largo-de-11000-millones-de-anos/

- Miden la expansión del Universo a lo largo de 11.000 millones de años
Madri+d
29 July 2020
http://www.madrimasd.org/notiweb/noticias/miden-expansion-universo-largo-11000-millones-anos

- Propuesta para incluir el Einstein Telescope en las futuras infraestructuras de investigación europeas
Agencia SINC
10 September 2020
https://www.agenciasinc.es/Noticias/Propuesta-para-incluir-el-Einstein-Telescope-en-las-futuras-infraestructuras-de-investigacion-europeas

- La ciencia detrás de Tenet y los viajes en el tiempo
ABC
14 September 2020
https://www.abc.es/ciencia/abci-ciencia-detras-tenet-y-viajes-tiempo-202009130042_noticia.html

- Universos en la ciénaga
Investigación y Ciencia
1 October 2020
https://www.investigacionyciencia.es/revistas/investigacion-y-ciencia/los-reyes-del-bosque-809/universos-en-la-cinaga-19059

- Interview with Juan García-Bellido: "El desarrollo de LISA será clave para entender los orígenes del universo"
Madrid Diario
8 October 2020
https://bit.ly/3bSsZSk

- El universo puede contener millones de agujeros negros primordiales hechos de materia oscura
El País
8 October 2020
https://elpais.com/ciencia/2020-10-08/el-universo-puede-contener-millones-de-agujeros-negros-de-materia-oscura.html

- Los agujeros negros, los monstruos cuyos misterios ya no asustan a la ciencia
ABC
12 October 2020
https://www.abc.es/ciencia/abci-agujeros-negros-monstruos-cuyos-misterios-no-asustan-ciencia-202010102135_noticia.html

- Interview with Juan García-Bellido: «Saber que no somos nada es lo que nos hace especiales»
Diario Córdoba
16 October 2020
https://bit.ly/3vRmas9

- Interview with Juan García-Bellido: «Estamos entrando en una nueva era dorada de los agujeros negros»
ABC
17 October
https://www.abc.es/ciencia/abci-juan-garcia-bellido-estamos-entrando-nueva-dorada-agujeros-negros-202010170102_noticia.html

- Interview with Álvaro de Rújula «La ciencia no busca la "Verdad" con mayúscula, descubre aproximaciones cada vez más precisas a la verdad (científica)»
Rebelión
10 November 2020
https://bit.ly/3g8m8Fp

- El Ministerio de Ciencia e Innovación otorga las diez modalidades de los Premios Nacionales de Investigación
Europa Press
13 November 2020
https://bit.ly/34QNPxr

- El Ministerio de Ciencia e Innovación otorga las diez modalidades de los Premios Nacionales de Investigación
Murcia.com
13 November 2020
https://bit.ly/3z0tP9t

- Ordenadores cuánticos, o la "magia" que dará respuesta a (casi) todo
ElDiario.es
15 November 2020
https://www.eldiario.es/red/que-es/ordenadores-cuanticos-magia-dara-respuesta_1_6428584.html

- Ordenadores cuánticos, o la "magia" que dará respuesta a (casi) todo
InfoLibre
15 November 2020
https://bit.ly/3ckEja1

- Los catedráticos de la UAM Francisco Sánchez Madrid y Luis Ibáñez, galardonados en los Premios Nacionales de Investigación 2020
16 November 2020
UAM Gazette
https://bit.ly/3wNJLdp

- El Ministerio de Ciencia e Innovación otorga las diez modalidades de los Premios Nacionales de Investigación
Madri+d
16 November 2020
https://bit.ly/3cjzjIN

- Interview with Álvaro de Rújula "Para saber si hay una verdadera teoría del todo, yo esperaría primero a verla"
Rebelión
17 November 2020
https://rebelion.org/para-saber-si-hay-una-verdadera-teoria-del-todo-yo-esperaria-primero-a-verla/

- Interview with Álvaro de Rújula "Imaginar lo aparentemente inimaginable es lo que hacen los mejores científicos"
Rebelión
24 November 2020
https://rebelion.org/imaginar-lo-aparentemente-inimaginable-es-lo-que-hacen-los-mejores-cientificos/

- La materia oscura a la luz de los rayos gamma
Investigación Y Ciencia
1 December 2020
https://www.investigacionyciencia.es/revistas/investigacion-y-ciencia/visitantes-interestelares-815/la-materia-oscura-a-la-luz-de-los-rayos-gamma-19257

- Premio Nobel de Física 2020
Madri+d
10 December 2020
https://www.madrimasd.org/notiweb/analisis/premio-novel-fisica-2020

- Interview with Juan García-Bellido: "Agujeros negros: de lo místico a un objetivo científico cada vez más abordable"
El Español
20 December 2020
https://bit.ly/3ijvzEO

15 Hitos
Highlights

Memoria Anual
Annual Report

2019-2020

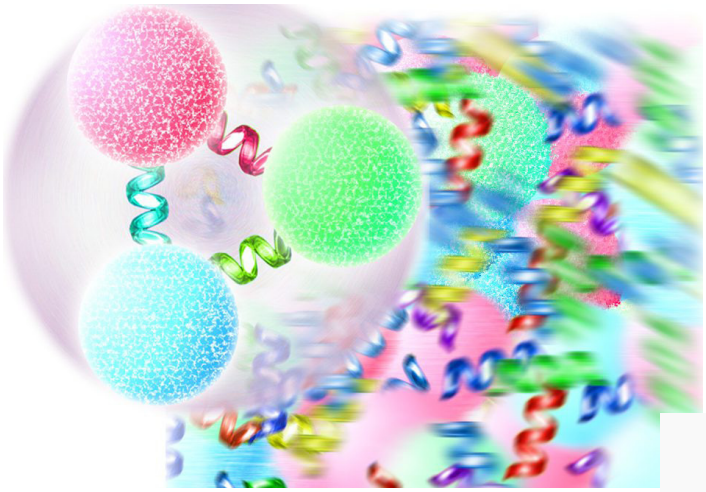
En 2019-2020, el IFT ha continuado su trayectoria de excelencia en el marco del proyecto Severo Ochoa, consolidando su reputación internacional como instituto de investigación. Hemos organizado unas dos decenas de congresos y escuelas, con participación de varios cientos de visitantes, y hemos publicado más de200 artículos por año que acumulan miles de citas.

Las páginas siguientes reflejan algunos de los hitos en el IFT, tanto resultados científicos en las diferentes líneas de investigación, como en su progeso como centro de excelencia.

During 2019-2020 the IFT continued experiencing a qualitative jump in many aspects related to our Severo Ochoa Grant, enhancing its status of international excellence. We organized about two dozen specialized programs, workshop and schools attended by several hundred scientists, and published over 200 papers per yearcollecting several thousand citations.

The next pages reflect some of the main achievements of the IFT, both at the scientific level, in different research lines, as well as in its structure as a center of Excellence.

Nuevas redes internacionales
New international networks



STRONG 2020

HIDDeN and HIDDen Plus

A new Marie Skłodowska-Curie Innovative Training Network (MSCA-ITN) funded by the European Union H2020 programme named HIDDeN ("Hunting Invisibles: Dark sectors, Dark matter and Neutrinos") has started in 2020.
Professor Belén Gavela is the Principal Investigator of the IFT/UAM beneficiary node.

HIDDeN will focus on revealing the hidden (a)symmetries, and the particles on which they act, in particular the invisible sector, made of neutrinos, dark matter and other elusive particles.

The node composition of this project will be 95% alike to that of two previous ITNs: FP7 ITN "Invisibles" (2002-2016, www.invisibles.eu) and H2020 ITN "Elusives" (2016-2020, www.elusives.eu). It involves 12 Beneficiaries nodes from 5 EU Member States: UK (University of Durham and University of Southampton), France (Centre National de la Recherche Scientifique CNRS), Italy (Instituto Nazionale di Fisica Nucleare), Germany (Heidelberg University, Karlsruhe Institute of Technology and Georg-August-Universitaet Goettingen Stiftung Oeffentlichen Rechts), Spain (Universidad Autónoma de Madrid, Universitat de Valencia, Universitat de Barcelona and Ediciones El País S.L) and Switzerland (Universitaet Zuerich). The network includes in additions 21 partner organisations around the world, out of which seven are Private sector enterprises.

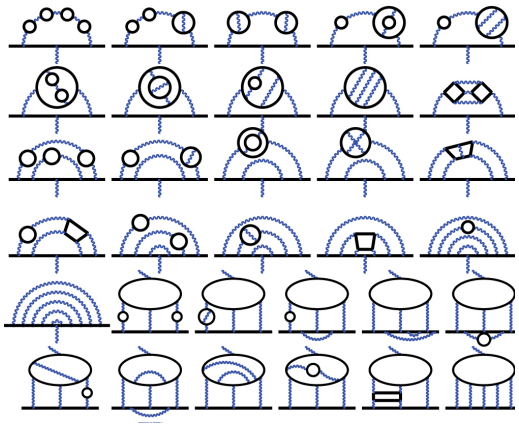
STRONG-2020

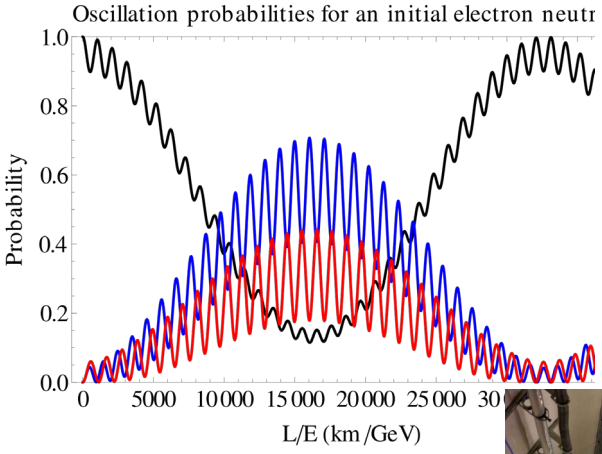
The STRONG-2020 project brings together many of the leading research groups and infrastructures involved today in the study of the strong interaction in Europe, and also exploits the innovation potential in applied research through the development of detector systems with applications beyond fundamental physics, e.g. for medical imaging and information technology.

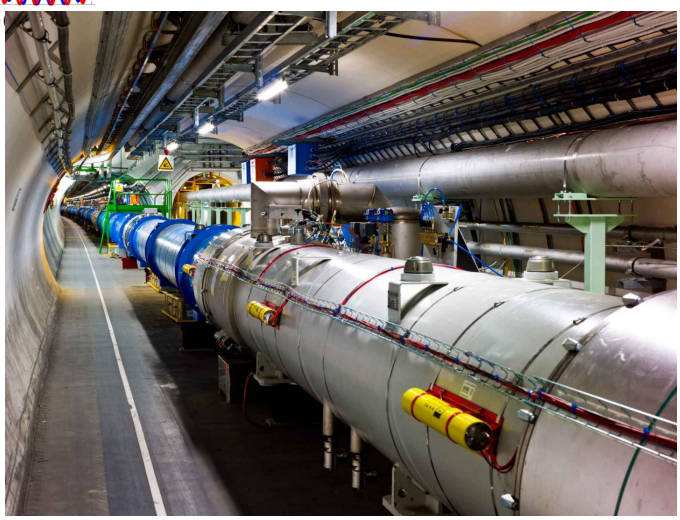
The Consortium includes 44 participant institutions, embracing 14 EU Member States, one International EU Interest Organization (CERN), and one EU candidate country. Together with host institutions of 21 other countries, without EU funds benefits, the project involves research in 36 countries. The project is structured in 32 Work Packages (WP): 7 Transnational Access Activities (TA), 2 Virtual Access Activities (VA), 7 Networking Activities (NA) and 14 Joint Research Activities (JRA). Furthermore, 2 WPs take care, respectively, of the "Management and Coordination" of the project and of "Communication and Outreach".

More information: http://www.strong-2020.eu

Resultados de alto impacto
High impact results







The anomalous magnetic moment of the muon in the Standard Model

Authors: 132 authors, including G. Herdoíza from the IFT
Phys.Rept. 887 (2020)

Review of the present status of the Standard Model calculation of the anomalous magnetic moment of the muon. This is performed in a perturbative expansion in the fine-structure constant α and is broken down into pure QED, electroweak, and hadronic contributions.

Updated global analysis of three-flavor neutrino oscillations

Title: The fate of hints: updated global analysis of three-flavor neutrino oscillations
Authors: Ivan Esteban, M.C. Gonzalez-Garcia, Michele Maltoni, Thomas Schwetz, Albert Zhou
JHEP 09 (2020) 178

Combined analysis of the latest neutrino oscillation data presented at the Neutrino2020 conference, showing that previous hints for the neutrino mass ordering have significantly decreased, and normal ordering (NO) is favored only at the 1.6σ level

MSSM Higgs Boson Searches at the LHC

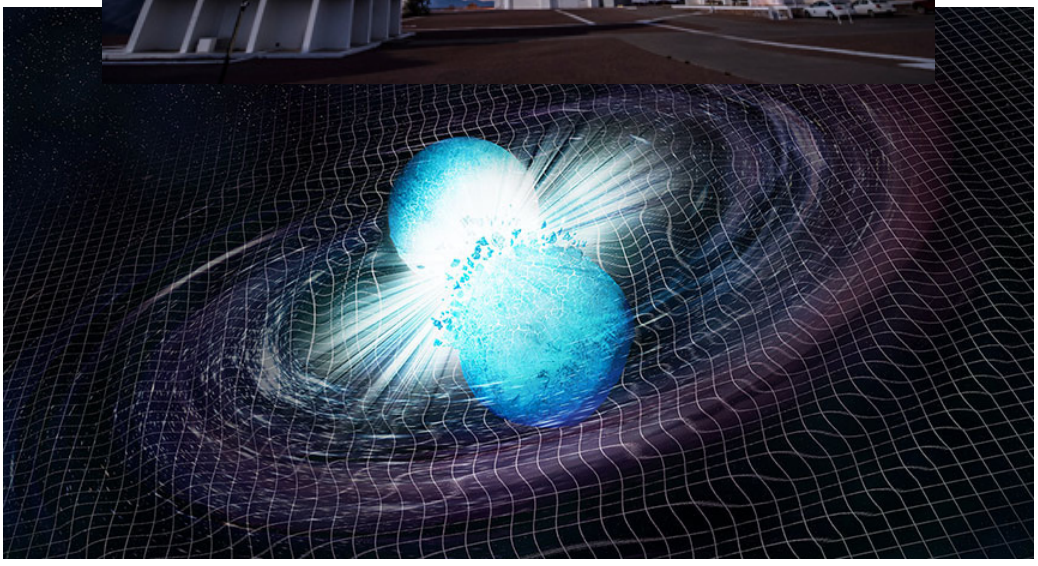
Título: MSSM Higgs Boson Searches at the LHC: Benchmark Scenarios for Run 2 and Beyond
Authors: Emanuele Bagnaschi, Henning Bahl, Elina Fuchs, Thomas Hahn, Sven Heinemeyer, Stefan Liebler, Shruti Patel, Pietro Slavich, Tim Stefaniak, Carlos E.M. Wagner, Georg Weiglein
Eur.Phys.J.C 79 (2019) 7, 617

We propose six new benchmark scenarios for Higgs boson searches in the Minimal Supersymmetric Standard Model. Our calculations follow the recommendations of the LHC Higgs Cross Section Working Group, and benefit from recent developments in the predictions for the Higgs-boson masses and mixing. All of the proposed scenarios are compatible with the most recent results from Run 2 of the LHC. In particular, they feature a scalar with mass and couplings compatible with those of the observed Higgs boson, and a significant portion of their parameter space is allowed by the limits from the searches for SUSY particles and additional Higgs bosons

Memoria Anual
Annual Report

2019-2020

DARK ENERGY SURVEY



Dark Energy Survey completes six-year mission

After scanning in depth about a quarter of the southern skies for six years and cataloguing hundreds of millions of distant galaxies, the Dark Energy Survey (DES) finished taking data on January 9th 2019.

The survey is an international collaboration in a quest to understand the nature of dark energy, the mysterious force that is accelerating the expansion of the universe. Using the Dark Energy Camera, a 520-megapixel digital camera funded by the U.S. Department of Energy Office of Science and mounted on the Blanco 4-meter telescope at the National Science Foundation's Cerro Tololo Inter-American Observatory in Chile, scientists on DES took data on 758 nights over six years.

Over those nights, they recorded data from more than 300 million distant galaxies. More than 400 scientists from over 25 institutions around the world have been involved in the project, which is hosted by the U.S. Department of Energy's Fermi National Accelerator Laboratory. The collaboration has already produced about 200 academic papers, with more to come.

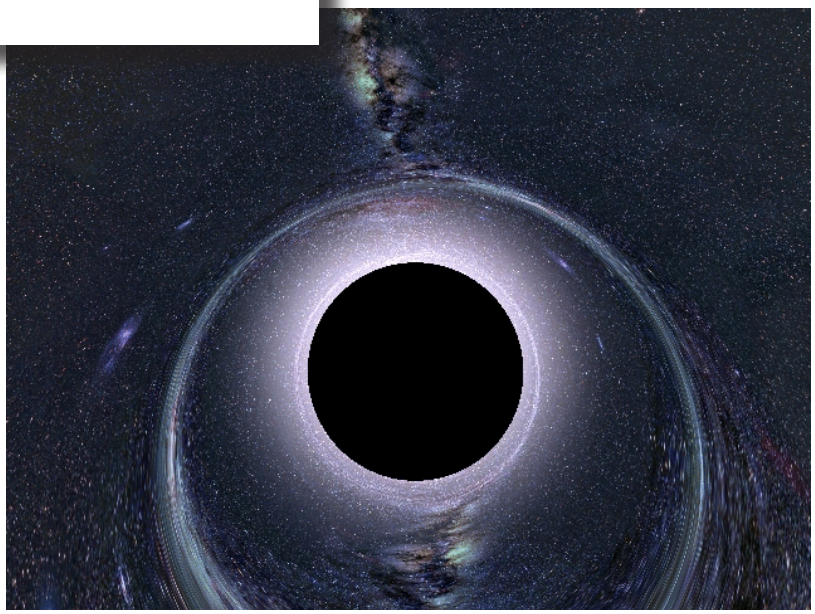
First Measurement of the Hubble Constant from a Dark Standard Siren

Authors:LIGO and DES collaborations, including J. García-Bellido
Astrophys.J.Lett. 876 (2019) 1, L7

Multi-messenger measurement of the Hubble constant H 0 using the binary–black-hole merger GW170814 as a standard siren, combined with a photometric redshift catalog from the Dark Energy Survey (DES). The luminosity distance is obtained from the gravitational wave signal detected by the Laser Interferometer Gravitational-Wave Observatory (LIGO)/Virgo Collaboration (LVC) on 2017 August 14, and the redshift information is provided by the DES Year 3 data.

Memoria Anual
Annual Report

2019-2020



On the Maximal Strength of a First-Order Electroweak Phase Transition and its Gravitational Wave Signal

Authors:John Ellis, Marek Lewicki, José Miguel No
JCAP04(2019)003, JCAP 04 (2019) 003

What is the maximum possible strength of a first-order electroweak phase transition and the resulting gravitational wave (GW) signal? We study the conditions for successful bubble percolation and completion of the electroweak phase transition in theories beyond the Standard Model featuring polynominal potentials. The resulting GW signal originates mostly from sound waves and turbulence in the plasma, rather than bubble collisions. We find the peak frequency of the GW signal from the phase transition.

On Exclusion of Positive Cosmological Constant

Authors:G. Dvali, C. Gómez
Fortsch.Phys. 67 (2019) 1-2, 1800094

Quantum consistency suggests that any de Sitter patch that lasts a number of Hubble times that exceeds its Gibbons-Hawking entropy divided by the number of light particle species suffers an effect of quantum breaking. Inclusion of other interactions makes the quantum break-time shorter. The requirement that this must not happen puts severe constraints on scalar potentials. We can say that string theory as a consistent theory of quantum gravity nullifies a positive vacuum energy in self-defense against quantum breaking.

alpha' corrections of Reissner-Nordström black holes

Authors: Pablo A. Cano, Samuele Chimento, Román Linares, Tomás Ortín, Pedro F. Ramírez
JHEP 02 (2020) 031

We study the non-extremal 4-dimensional dyonic Reissner-Nordström (RN) black holes with equal electric and magnetic charges in the context of Heterotic Superstring effective field theory. We determine analytically the position of the event horizon of the black hole, as well as the corrections to the extremality bound, to the temperature and to the entropy, checking that they are related by the first law of black-hole thermodynamics, so that $\partial S/\partial M = 1/T$. We discuss the implications of our results in the context of the Weak Gravity Conjecture, clarifying that entropy corrections for fixed mass and charge at extremality do not necessarily imply corrections to the extremal charge-to-mass ratio

Premios y nombramientos
Award and appointments

Luis Ibáñez, Premio Nacional de Investigación "Blas Cabrera"

Luis Ibáñez, director del IFT, ha sido galardonado con el Premio Nacional de Investigación 2020 en la modalidad "Blas Cabrera" en el área de Ciencias Físicas, de los Materiales y la Tierra.

Los Premios Nacionales de Investigación, creados en 1982, suponen el reconocimiento más importante de España en el ámbito de la investigación científica. Tienen como objetivo distinguir el mérito de aquellos investigadores e investigadoras de nacionalidad española que estén realizando una labor destacada en campos científicos de relevancia internacional y que contribuyan excepcionalmente al avance de la ciencia, a la transferencia de tecnología y al progreso de la humanidad.

El premio a Luis Ibáñez en la edición 2020 ha sido otorgado en reconocimiento "por su labor en el ámbito de las teorías de la supersimetría, teoría de las cuerdas y de la supergravedad para la concepción actual de la Física de Partículas".

Luis Ibáñez gets the "Blas Cabrera" Spanish National Research Award

Luis Ibáñez, director of the IFT has been awarded the Spanish "Blas Cabrera" National Research Award in Physics, Material Sciences and Earth Sciences.

The National Reseach Awards, launched in 1982, are the highest recognition in Spain in the context of scientific research. They intend to highlight the merit of those Spanish researchers leading outstanding research activities at the highest international level, and contributing with breakthroughs in the advance of Science, technology transfer and progress of Humankind.

The 2020 Award for Luis Ibáñez recognized his work in the theories of supersymmetry, string theory and supergravity towards our present knowledge of Particle Physics.

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Belén Gavela, en el grupo de Estrategia Europea de Física de Partículas

Belén Gavela fue nombrada miembro del Grupo Preparatorio de la actualización 2020 de la Estrategia Europea de Física de Partículas.

El documento oficial elaborado por este comité, planifica la hora de ruta para las actividades de Física de Partículas en el CERN en los próximos años. Su aprobación por el Consejo del CERN se producirá a lo largo de 2021.

Belén Gavela, in the European Strategy for Particle Physics Group

Belén Gavela was appointed member of the Physics Preparatory Group. for the 2020 update of the European Strategy for Particle Physics.

The official document, prepared by this committee, lays down a roadmap for particle physics activities at CERN in years to come. Its approval by the CERN Council will take place during 2021.

Libro Blanco del CSIC

En 2020 el CSIC promovió la elaboración de un Libro Blanco Desafíos Científicos CSIC 2030, planificando las prioridades científicas y tecnológicas en las áreas de investigación del CSIC.

El IFT, a través de sus representantes Tomás Ortín, Alberto Casas, Sven Heinemeyer, Fernando Marchesano y Germán Sierra, realizó una importante labor en la preparación del Volumen 9, dedicado a la "Comprensión de los componentes básicos del universo, su estructura y evolución" y el Volumen 10, dedicado a la "Información Compleja y Digital".

Más información:
https://www.csic.es/es/actualidad-del-csic/el-csic-lanza-14-desafios-para-ampliar-el-conocimiento-sobre-la-vida-la-materia

CSIC White Book

In 2020 CSIC promoted the elaboration of a 'White Book' on CSIC Scientific Challenges 2030, delineating the scientific and technological priorities in all areas covered by CSIC.

The IFT, through their representatives Tomás Ortin, Alberto Casas, Sven Heinemeyer, Fernando Marchesano and Germán Sierra, played an important role in Volume 9, dedicated to the 'Understanding the basic components of the universe, its structure and evolution', and Volume 10, about "Complex and Digital Information".

More information:
https://www.csic.es/es/actualidad-del-csic/el-csic-lanza-14-desafios-para-ampliar-el-conocimiento-sobre-la-vida-la-materia

Comité de Igualdad, Diversidad e Inclusión
Equity, Diversity and Inclusion Committee

El comité de Igualdad, Diversidad e Inclusión del IFT se creó en 2019, con el mandato de asesorar a la Dirección y la Junta del IFT sobre estos importantes aspectos, así como de elaborar un Plan de Acción para el IFT. Este plan se ha completado y se aprobará en 2021.

El comité juega asimismo un papel fundamental en la organización de actividades de divulgación en fomento del equilibrio de género en Ciencia, y en particular ha sido esencial en la organización de las exitosas campañas #YoFisica y #YoutubersPorUnDia, con ocasión del Día Internacional de la Mujer y la Niña en la Ciencia, el 11 de Febrero de los cursos 2019-20 y 2020-21, respectivamente. Estas actividades se han descrito en las páginas sobre acciones en Igualdad de Género en la sección de Divulgación.

The IFT Equity, Diversity and Inclusion (EDI) committee was created in 2019 with the mandate to advise the Directors and the Institute Board on these important issues as well as to elaborate an Action Plan for the IFT, which is by now finished and will be approved in 2021.

The EDI committee also plays a key role in the organization of outreach activities supporting gender balance in Science, and in particular was instrumental in the organization of the very successful campaigsn #YoFisica and #YoutubersPorUnDia for the International Day of Girls and Women in Science, on February 11th of the 2019-20 and 2020-21 academic years, respectively. These actions have been described in the Gender Balance action pages in the Outreach section.

En recuerdo de Mathieu Boudaud
In memory of Mathieu Boudaud

A comienzos de 2020 en el IFT recibimos la dolorosa noticia del fallecimiento de Mathieu Boudaud. Mathieu se había unido al IFT pocas semanas antes, como investigador postdoctoral en el grupo de Astropartículas. Era una persona amable y gentil, muy querida por su familia, amigos y colegas, y un investigador lleno de talento, que trabajaba con pasión y entusiasmo.

Con esta nota queremos expresar nuestra cercanía y más sinceras condolencias con la familia y amigos de Mathieu, y ofrecer este espacio como recuerdo permanente en la memoria colectiva del IFT.

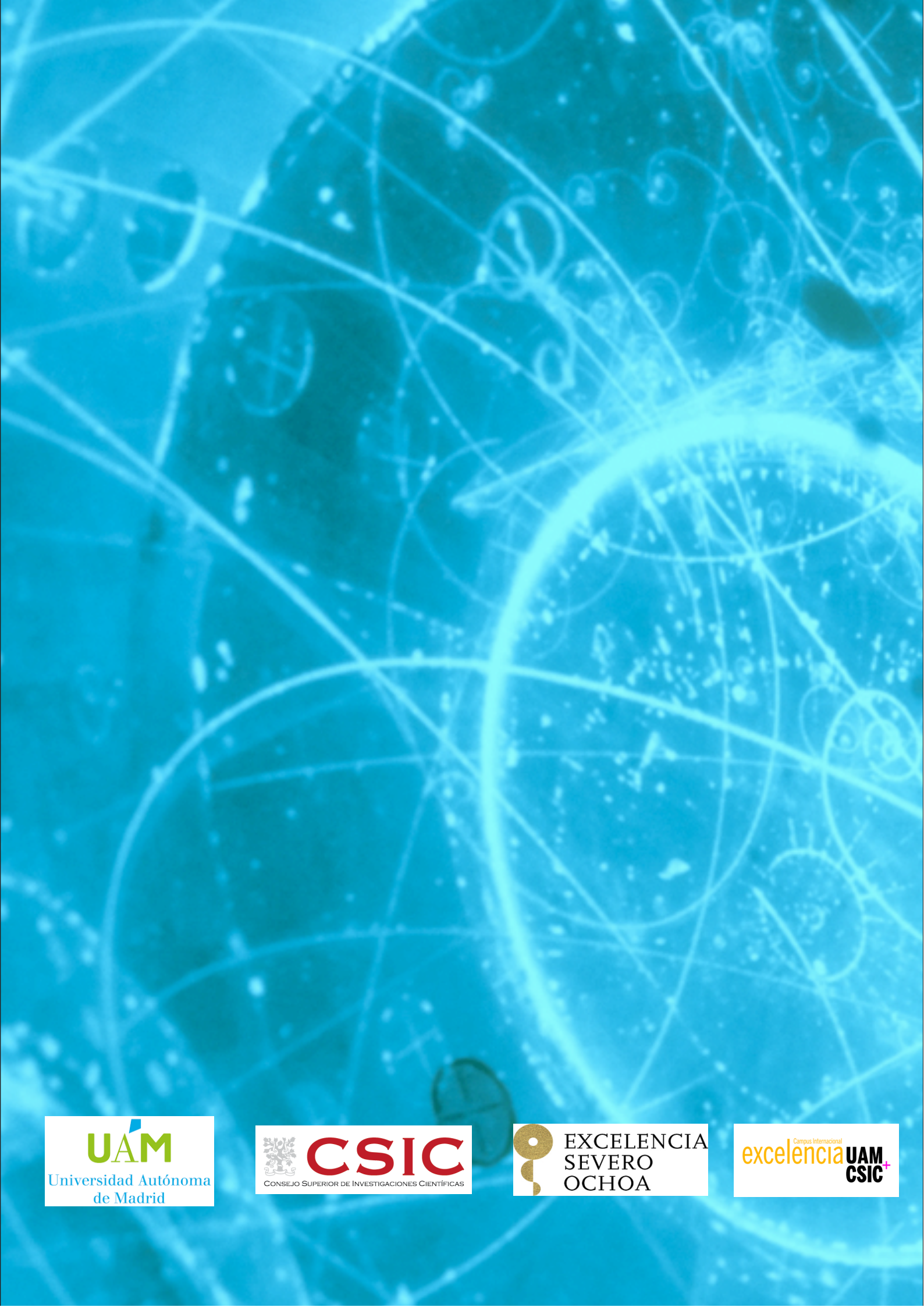
At the beginning of 2020 we at the IFT were saddened by the passing away of Mathieu Boudaud. Mathieu had recently joined the IFT as a postdoc in the Astroparticle group. He was a kind and gentle person, beloved by his family, friends and colleagues, and a very talented scientist, who worked with passion and enthusiasm.

With this note we want to express our sympathy and heartfelt condolences to Mathieu's family and friends, and to remember Mathieu in the collective IFT memories.

Visita del Comité Asesor Científico
Visit of the Scientific Advisory Board

En Octubre de 2019 recibimos la visita de nuestro Comité Asesor Científico, que mantuvo reuniones con los diferente órganos de gestión del IFT, así como con los investigadores senior, postdocs, predocs, y el personal de administración y computación. El Comité elaboró un informe expresando su muy positiva valoración del IFT y aportando diversas recomendaciones para mejorar determinados aspectos en la organización del IFT. Agradecemos al Comité su esmerado trabajo y sus extremadamente útiles sugerencias, que estamos incorporando en el IFT.

In October 2019 we received the visit of our Scientific Advisory Board who had a series of meetings with the governing bodies of the IFT as well as with senior staff, postdocs, predocs, IT members and administration of the institute. They produced a report in which they showed a very positive impression about IFT while giving a number of recommendations for improvements in different aspects of IFT organization. We thank our SAB for their work and their very useful suggestions which we will try to implement in the institute.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