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High-school students dive into Particle Physics

- **Worldwide program opens the window of cutting-edge physics to young investigators**

Madrid, Tuesday 4 April 2017. During the coming weeks, high-school students around the world are invited to nearby research institutes and universities for a day-long programme to experience life at the forefront of basic research. These International Masterclasses give students the opportunity to become particle physicists for a day. During a Masterclass, participants work with data from experiments at CERN´s Large Hadron Collider, or LHC, under the supervision of physicists. The Masterclasses this year are organized for March 1 through April 11 and will attract students from 52 countries worldwide.

Particle physics is one of the most important emerging fields in science. The discovery of the Higgs boson at the LHC in summer 2012 led to a huge media echo and large public interest. International Masterclasses meet this interest and offer high-school students the chance to explore this field of cutting-edge physics by working with recent, authentic data from experiments at the LHC. The basic idea of the annual program is to let students work as much as possible like real scientists. “Students get a taste of how modern physics research works by working directly with particle physicists and using real LHC data,” says Michael Kobel, physics professor from Technical University Dresden and head of the program.

Four experiments - ATLAS, CMS, ALICE, and LHCb - have made data available for educational use within the program. “During the day students understand how a scientific discovery can be claimed,” Kobel points out.

Scientists at about 210 universities and laboratories in 52 countries worldwide host International Masterclasses at their home institutions. New participants in the program come from Bangladesh, Georgia, Montenegro, Russia, and Rwanda. The worldwide participation reflects the international collaboration in particle physics. To simulate a real scientific working environment, each Masterclass ends with a video conference, where student groups from different countries connect with two

moderators at CERN or Fermilab (Batavia, Illinois, U.S.) to combine and discuss their results. They can also pick their moderators' brains in a Q&A section. Most video conferences end with a multiple choice quiz on particle physics. More than 60 physicists have volunteered to moderate the video conferences at CERN or Fermilab.

The Institute for Teoretical Physics IFT UAM-CSIC, Madrid is participating in the program on April 6th 2017. The IFT has invited 40 students from the area. Carlos Pena, a particle physicist working at the IFT, is looking forward to the event: "The students really love the program. They are excited to deal with real data from the LHC, and to learn about fundamental Physics talking to scientists working in the field."

International Masterclasses are led by Technical University Dresden and QuarkNet, in close cooperation with the International Particle Physics Outreach Group (IPPOG). IPPOG is an independent group of outreach representatives from countries involved in the research at CERN and other leading research laboratories. The group's goal is to make particle physics more accessible to the public.

For further information:
International Masterclasses: www.physicsmasterclasses.org
IFT International Masterclass: https://workshops.ift.uam-csic.es/masterclass2017
Schedule (videoconferences with CERN):
www.physicsmasterclasses.org/index.php?cat=schedule
Schedule (videoconferences with Fermilab):
https://quarknet.i2u2.org/page/videoconferences-2017#fnal

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ABOUT IFT UAM-CSIC

The Institute for Theoretical Physics (IFT) UAM-CSIC was officially created in 2003 as a joint research center belonging to the Spanish National Research Council (CSIC) and the Autonomous University of Madrid (UAM). It is the only Spanish center dedicated entirely to research in Theoretical Physics. The IFT members develop research in the frontiers of Elementary Particle Physics, Astroparticles and Cosmology, in order to understand the fundamental keys of Nature and the Universe. They are also leading many research projects, both at the national and international level. The IFT is part of the strategic line `Theoretical Physics and Mathematics´ of the Campus of International Excellence (CEI) UAM+CSIC established in 2009. Since 2012, it is credited as Severo Ochoa Centre of Excellence.

Besides purely scientific activity, in the IFT is also conducted intensive training tasks of young researchers and professionals through the graduate program in Theoretical Physics with mention of excellence from the CEI and the Ministry of Education. In addition, the Institute carries out the important task of transferring knowledge to society through several outreach programs.