Artificial Intelligence Unlocks New Frontiers in Exploring the Universe

- **International experts gather in Madrid for the AI goes MAD² conference to explore the impact of machine learning on the study of the universe and fundamental particles.**

- **The relationship between theoretical physics and AI stands out in an event marked by the recent Nobel Prizes in Physics and Chemistry.**

Members of the second edition of the AI goes MAD² conference this week at the IFT /IFT.

Madrid, October 15, 2024. – The Institute for Theoretical Physics (IFT UAM-CSIC) is hosting the second edition of the *AI goes MAD²* conference this week. This three-day event, held at the IFT's facilities on the UAM campus, brings together international experts in theoretical physics and artificial intelligence (AI) to discuss the latest advancements at the intersection of these two research fields.

This year's edition covers a broader range of topics, reflecting the growing interest and participation from the scientific community in the interaction between AI and physics. According to researcher Ernesto Arganda, one of the event's organizers: *"This edition has achieved greater thematic diversity and an increase in participants, which is optimal for establishing this workshop as a long-term event."*

Arganda also highlights the event's relevance in the current context: *"It coincides with the recent Nobel Prizes in Physics and Chemistry and the rise of the AI Revolution, making this meeting not only interesting for society at large but also essential for the theoretical physics community."*

For his part, astrophysicist and IFT researcher Miguel Ángel Sánchez Conde points to the growing importance of these technologies: *"AI techniques are gradually becoming standard tools not only within our community but also across other scientific fields. That's why workshops like this are crucial to fostering knowledge exchange at this timely moment."*

The conference's goal is to facilitate the exchange of ideas among researchers from various disciplines, including particle physics, gravity, strings, cosmology, astrophysics, quantum computing, and high-performance computing. Applications of AI and machine learning in these fields are transforming both research methods and data analysis in theoretical physics.

Among the notable speakers are Savannah J. Thais (Columbia University), discussing the evolving role of AI in particle physics; Cecilia Garraffo (Harvard University), presenting AI-driven advancements in astronomy; and Mario Krenn (Max Planck Institute for the Science of Light), who will explore how AI tools inspire new ideas in science.

The conference agenda features sessions from leading institutions such as MIT, Max Planck, Columbia, Harvard, and UAM, covering topics ranging from the use of deep

learning in gamma-ray observatories to the application of AI in searching for large-scale structures in the universe.

IFT

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.

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