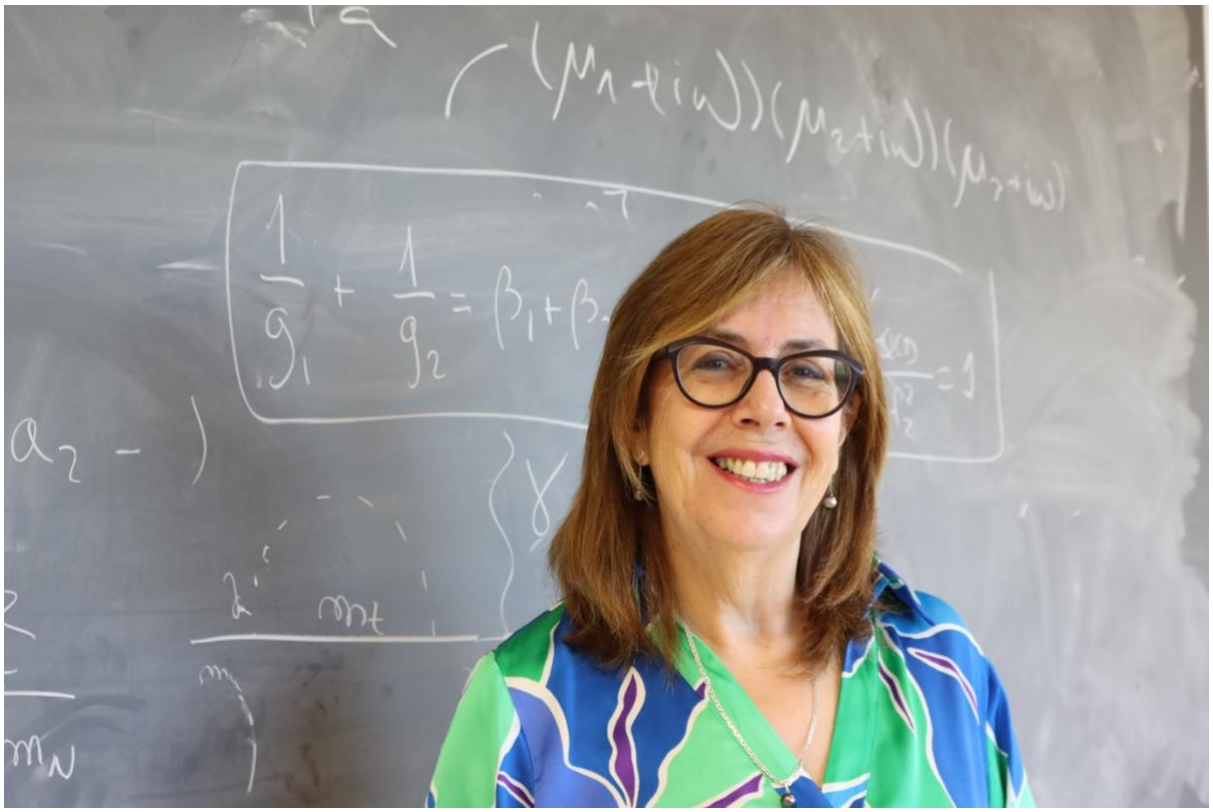
Belén Gavela acknowledged with the Julius Wess Award 2023 for pioneering research in particle physics

- **By the KIT Center for Elementary Particle and Astroparticle Physics (KCETA) at the Karlsruhe Institute of Technology (KIT)**



Credit: IFT

Madrid, December 14th, 2023.- Belén Gavela, a foundational member of the Institute for Theoretical Physics (IFT) since its inception, affiliated with the Autonomous University of Madrid (UAM) and the Spanish National Research Council (CSIC), has been honored with the distinguished Julius Wess Award 2023 by the KIT Center for Elementary Particle and Astroparticle Physics (KCETA) at the Karlsruhe Institute of Technology (KIT).

Belén Gavela's groundbreaking research has fostered our understanding of the fundamental nature of particles and their interactions. Her investigations into **CP violation and flavor physics in quarks and leptons** have unveiled critical insights into the asymmetry between matter and antimatter, one of the profound mysteries of particle behavior.

Moreover, her exploration of the dynamics of neutrino oscillations has been pivotal in comprehending the elusive properties of neutrinos, shedding light on their oscillatory nature and oscillation probabilities, which are crucial in the study of neutrino masses and mixing and their CP properties.

Belén Gavela is also one of the founders of the subfield of weak matrix elements on the lattice, the latter being a theoretical framework used in particle physics to discretize spacetime into a grid-like structure, enabling calculations and simulations of quantum field theories on a finite grid.

In addition, Belén Gavela's work in investigating effective field theories associated with electroweak symmetry breaking stands out. Her theoretical insights into the fundamental forces and the mechanisms underlying the breaking of electroweak symmetry have significantly enriched our understanding of the building blocks of 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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