



Departamento de
Física de la
Materia Condensada
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Quantum trapping based on the Casimir force

The Casimir-Lifshitz force, originated from the quantum fluctuations of vacuum, is especially intense between interacting objects at nanoscale distances. This force can be attractive or repulsive, depending, amongst others, on the optical properties of the materials. This fundamental phenomenon can be put into practice to control adhesion, friction and stiction between surfaces in the so-called nano- and micro-electromechanical devices (NEMS and MEMS), which are part of many of the devices we use in our daily lives and that may stop working properly due to those effects. During this talk, I will present a theoretical study about the influence of the optical properties of materials on the Casimir-Lifshitz force in the plane-parallel geometry. Particularly, I will show the possibility of controlling the quantum levitation phenomenon of self-standing thin films through the optical properties of nanostructured materials, by means of nano-structuration in multilayer configurations, or by including optical disorder in an otherwise homogeneous thin film.

Sol Carretero obtained her PhD in 2011 (Universidad de Zaragoza) working on the theoretical analysis of the Extraordinary Optical Transmission in metallic nano-holes. In 2012, granted by a Humboldt Fellowship, she moved to Ludwig-Maximilians-Universität München (LMU) where she worked on the control and manipulation of nano- and micro-objects with optical tweezers. After that, she focused on the optical design of highly efficient solution processed solar cells at the Institute of Materials Science of Seville (ICMS) with a Juan de la Cierva Incorporación contract (2014 call). There, she also triggered a new research line on the manipulation of Casimir-Lifshitz forces by tuning the optical properties of the interacting materials. Since 2018, she works at Universidad Autónoma de Madrid (UAM) as Prof. Ayudante Doctor designing highly efficient opto-electronic devices (nano-lasers, perovskite LEDs, etc) with additional functionalities.

Con la colaboración de:



Facultad de Ciencias
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11 Marzo (viernes)

HORA: 12:30

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