

CMM PDE Seminar

Speaker: Manuel del Pino (University of Bath, Inglaterra)

Título: Delaunay-type compact equilibria in the liquid drop model.

Abstract

We deal with the *liquid drop model*, introduced by Gamow (1930) and Bohr-Wheeler (1939) in nuclear physics to describe the structure of atomic nuclei. The problem consists of finding a surface $\Sigma = \partial\Omega$ in \mathbb{R}^3 that is critical for the following energy of regions $\Omega \subset \mathbb{R}^3$:

$$\mathcal{E}(\Omega) = \text{Per}(\Omega) + \frac{1}{2} \int_{\Omega \times \Omega} \frac{dxdy}{|x-y|}$$

under the volume constraint $|\Omega| = m$. The associated Euler-Lagrange equation is

$$H_{\Sigma}(x) + \int_{\Omega} \frac{dy}{|x-y|} = \lambda \quad \forall x \in \Sigma, \quad |\Omega| = m,$$

where λ is a constant Lagrange multiplier. Round spheres enclosing balls of volume m are always solutions. They are minimizers for sufficiently small m . Since the two terms in the energy compete, finding non-minimizing solutions can be challenging. We find a new class of solutions with large volumes, consisting of "pearl collars" with an axis located on a large circle, with a shape close to a Delaunay's unduloid surface with constant mean curvature. This is joint work with Monica Musso and Andrés Zúñiga.

Venue: Sala de seminarios DIM del 5o piso, Beauchef 851.

Zoom: <https://uchile.zoom.us/j/96642349167?pwd=MkRVbWxzOFBUUXICTWFicW0reWZ6dz09>

Fecha: Jueves, 11 de julio de 2024 a las 16:15

For further information, see our webpage: <https://eventos.cmm.uchile.cl/pdeseminar/>

