

Seminario de Geometría y Topología



Gravitating vortices and the Einstein-Bogomol'nyi equations

Mario García Fernández (ICMAT-CSIC)

Resumen:

The Einstein-Maxwell-Higgs equations in general relativity describe the coupling of gravity with an electromagnetic field and a Higgs field. In this talk I will start by discussing special solutions of the Einstein-Maxwell-Higgs equations, known as cosmic strings. The existence problem for this type of solutions reduces to the study of the Einstein-Bogomol'nyi equations, an elliptic system for a pair of functions on the 2-dimensional sphere. During this lecture I will try to convince you that the key to the existence of cosmic strings is geometric invariant theory in algebraic geometry, and its relation with the theory of symplectic quotients. For this, we will consider the Kähler-Yang-Mills equations (as described in a previous lecture by Luis Álvarez-Cónsul) on the complex surface $P^1 \times P^1$. We will see that, in a sense, this setup provides a toy model for the recent solution of the Kähler-Einstein problem by X. X. Chen, S. K. Donaldson, and S. Sun. Joint work with Luis Álvarez-Cónsul and Oscar Garcia-Prada (Geometry & Topology, 2013, Comm. Math. Phys., 2017, and arXiv:1606.07699).

Lugar: Universidad Complutense de Madrid
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