

Dilluns 20 de gener del 2014, 15:00h

Aula Petita (CRM).

On shell interactions for Dirac operators: self-adjointness, point spectrum and confinement

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ABSTRACT: We will talk about spectral properties and the confinement phenomenon for the coupling $H + V$, where $H = -i\alpha \cdot \nabla + m\beta$ is the free Dirac operator in \mathbb{R}^3 and V is a measure-valued potential. The potentials V under consideration will be given in terms of surface measures on the boundary of bounded regular domains in \mathbb{R}^3 .

We will give a criterion for the existence of point spectrum, with applications to electrostatic shell potentials. Furthermore, a criterion for generating confinement will be given and, as an application, some known results about confinement on the sphere for electrostatic plus Lorentz scalar shell potentials will be generalized to regular surfaces.

This is a joint work with N. Arrizabalaga and L. Vega.