Ciências ULisboa

SEMINÁRIO

ANÁLISE E EQUAÇÕES DIFERENCIAIS

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CMAFcIO

Symmetry results in two-dimensional inequalities with magnetic fields

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Abstract:

In this talk I will discuss symmetry and symmetry breaking properties of two-dimensional magnetic Schrödinger operators involving either a Lorentz potential inducing a constant magnetic field in the orthogonal direction or an Aharonov-Bohm magnetic vector potential. We investigate the symmetry properties of the optimal potential for the corresponding magnetic Keller-Lieb-Thirring inequality. For constant magnetic fields, we prove symmetry when the intensity is small. In the case of an AB magnetic vector potential, we prove radial symmetry if the intensity of the magnetic field is below an explicit threshold, while symmetry is broken above a second threshold corresponding to a higher magnetic field. The method relies on the study of the symmetry properties of the optimal functions in a magnetic Hardy-Sobolev interpolation inequality. To establish the symmetry breaking range in the AB case, we exploit the coupling of the phase and of the modulus and also obtain a quantitative result. The talk is based on joint works with Manon Nys and Jean Van Schaftingen and Jean Dolbeault, Maria Esteban, Ari Laptev and Michael Loss.

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