

# Mathematical Physics

Nonlinear flows, rigidity and eigenvalues of Schrödinger operators

**Maria Esteban**

CNRS and University Paris-Dauphine, France

In this talk I will present various recent results obtained in collaboration with J. Dolbeault, A. Laptev and M. Loss where we give optimal estimates for the principal eigenvalue of Schrödinger operators in compact and non compact manifolds. We do it by relating these estimates to interpolation inequalities, for which we can obtain the value of the best constants using nonlinear flows methods. Some rigidity results obtained for positive solutions of nonlinear elliptic equations on those manifolds allow us to study the cases where only the trivial solution exists, which helps to have a better view of the optimal constants and of the optimal potentials. In particular in the case of spheres and cylinders we show that for small enough potentials (the smallness being measured in some  $L^p$  norm) the optimal potentials are "trivial" and explicit.