DIPARTIMENTO DI MATEMATICA E FISICA "NICCOLÒ TARTAGLIA"
FACOLTÀ DI SCIENZE MATEMATICHE, FISICHE E NATURALI

Regularity of the optimal sets for spectral functionals

Introduce:
Prof. Marco Squassina
Università Cattolica del Sacro Cuore

Interviene:
Dott. Dario Mazzoleni
Università degli Studi di Torino

Abstract
We deal with shape optimization problems for eigenvalues of the Dirichlet Laplacian.
In particular we aim to study the minimization of the sum of the first k eigenvalues among open subsets of R^N with measure equal to one.
Existence of optimal sets follows from results by Buttazzo, Dal Maso, Bucur, Mazzoleni, Pratelli, Velichkov. The aim of this talk is to study the regularity of optimal shapes.
In order to do this, the first key point is to rewrite the problem in the setting of free boundary problems and we will highlight how this is the vectorial extension of the classical one-phase free boundary problem studied by Alt and Caffarelli.
Using mostly techniques coming from the free boundary, we will prove that the boundary of any optimal set is smooth, up to a singular set which has zero (N-1)Hausdorff measure.
The key tools are nondegeneracy results, monotonicity formulas, blow-up analysis, optimality condition in the viscosity sense and a boundary Harnack inequality.
If time permits, we will also discuss how this method can be extended to more general functionals.

This talk is mostly based on joint works with Susanna Terracini and Bozhidar Velichkov.

Seminario

Mercoledì 7 dicembre 2016
Sala Riunioni, ore 15.00
Via dei Musei 41 - Brescia

UNIVERSITÀ CATTOLICA
del Sacro Cuore