

Francesco Fidaleo

Harmonic analysis for inhomogeneous graphs and the Bose-Einstein condensation

Abstract:

We present some new spectral results for the adjacency operator of inhomogeneous infinitely extended networks obtained by additive negligible perturbations of the corresponding homogeneous ones.

It involves amenable (i.e. negligible perturbations of lattices) and non amenable graphs, like Cayley trees.

For the adjacency matrix, substantially different from the laplacian due to non homogeneity, the analysis concerns the study of:

- the so-called “integrated density of the states” (i.e. the distribution of the density of eigenvalues, in the limit of infinite “volume”);
- the character (i.e. transience/recurrence);
- the (natural) Perron-Frobenius weight.

All such objects are naturally connected with the Bose-Einstein condensation of the Bardeen-Cooper-Schrieffer pairs in the so-called “pure-hopping model” describing an infinite array of Josephson junctions, which we discuss as an application of the previous results.