

Quantum ergodicity on large regular graphs

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The usual Quantum Ergodicity Theorem (also known as Shnirelman theorem) deals with Laplacian eigenfunctions on compact manifolds. Assuming the geodesic flow is ergodic, it says that “most” eigenfunctions are uniformly distributed over phase space, in the large frequency régime. Uzy Smilansky has asked about an analogous statement for finite discrete graphs—in the régime where the size of the graph goes to infinity. We provide such a statement: a “typical” eigenfunction of the discrete Laplacian on a “typical” large regular graph is uniformly distributed over phase space. What replaces the ergodicity assumption is the expander property.

References

- [1] *Nalini Anantharaman, Étienne Le Masson*: Quantum ergodicity on large regular graphs, preprint 2013.
- [2] *Uzy Smilansky*: Discrete graphs - a paradigm model for Quantum Chaos. Séminaire Poincaré XIV, 2010.