

Séminaire : Problèmes spectraux en physique mathématique

Les séminaires ont lieu à l'**Institut Henri Poincaré**, 11 rue Pierre et Marie Curie, 75005 Paris.

Programme du lundi 22 mai 2017, en **salle 314** (3e étage)

— 11h15 - 12h15 : **Norbert Peyerimhoff** (Durham)

Spectral properties of Laplacians on the Kagome Lattice.

The Kagome lattice is one of the 11 Archimedean Tilings of the plane. In this talk, we use this example to illustrate spectral properties, and in particular properties of the Integrated Density of States (IDS), of Laplacians on combinatorial and metric graphs (both with equilateral and with random edge lengths).

The talk is based on joint results with Daniel Lenz, Olaf Post, Matthias Taeufer, and Ivan Veselic.

— 14h - 15h : **Normann Mertig** (Tokyo Metropolitan University)

Dynamical tunneling in systems with a mixed phase space.

In certain 1-dimensional Schrödinger Hamiltonian systems, the lifetimes of long-lived metastable states are associated with tunneling through potential barriers. In particular, the lifetime is semiclassically related to the action of a complex path joining trajectories of energy E in the bounded and unbounded region, along their common analytic continuation through the complex domain. While this picture generalizes to integrable systems, it breaks down for Hamiltonian systems whose classical limit exhibits a *mixed* phase space (namely, the phase space splits into disjoint regions of regular and chaotic motion).

We will consider the situation where long-lived metastable states are associated with bounded trajectories of regular motion, while their lifetimes are determined by so-called dynamical tunneling towards trajectories of chaotic motion. Since for mixed systems the analytic continuation of the tori terminates at natural boundaries, it is not possible to determine the lifetimes of long-lived states from complex paths along the analytic continuation of tori.

I will present how we handle such situations in a physicist's approach, by reducing the system to an integrable approximation and solving for the decay rates in the reduced system.

— 15h15 - 16h15 : **Faizan Nazar** (Paris-Dauphine)

Locality of the TFW equations.

In this talk, I will provide an overview of Density Functional Theory (DFT), which provides a collection of approximations to the ground state of the Schrödinger equation. I will focus on one such example, the Thomas-Fermi-von Weizsäcker model, and introduce pointwise exponential estimates for this model, that demonstrate the stability of ground states with respect to the nuclear configuration. We consider several applications of this results, as well as comparing this result to existing exponential decay results shown for quantum systems.

Pour tout renseignement, contacter les organisateurs

Hakim Boumaza (boumaza@math.univ-paris13.fr)

Mathieu Lewin (mathieu.lewin@math.cnrs.fr)

Stéphane Nonnenmacher (stephane.nonnenmacher@math.u-psud.fr)

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