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 11 avril 2016, en **salle 201 (2e étage)**

— 11h15 - 12h15 : **Mark Demers** (Fairfield Univ.)
Exponential decay of correlations for Sinai billiard flows

While billiard maps for large classes of dispersing billiards are known to enjoy exponential decay of correlations, the corresponding flows have so far resisted such analysis. We describe recent results, based on the construction of function spaces on which the associated transfer operator has good spectral properties, which provide a description of the spectrum of the generator of the semi-group. This construction, together with a Dolgopyat-type cancellation argument to eliminate certain eigenvalues, proves that the generator has a spectral gap and that the Sinai billiard flow with finite horizon has exponential decay of correlations.
This is joint work with V. Baladi and C. Liverani.

— 14h - 15h : **Laurent Bétermin** (Heidelberg)
Theta functions and minimization of interaction energies.

The goal of this talk is to explain how to minimize a finite lattice energy given by

$$E_f(L) := \sum_{p \in L \setminus \{0\}} f(|p|^2),$$

among Bravais lattices $L \subset \mathbb{R}^2$. Our method uses a two-dimensional theta function associated with L. We will show the optimality of the triangular lattice :
1) at any fixed density, if the potential f is completely monotonic ;
2) at fixed high density, for a large class of potentials ;
3) among all Bravais lattices, without density constraint, for some potentials f with a well.
Moreover, we will give some results of non-optimality of the triangular lattice at low density, and some numerical results, if f is the classical Lennard-Jones potential.

— 15h15 - 16h15 : **Claude Warnick** (Imperial College)
Black hole quasinormal modes and resonances.

Many types of black hole respond to linear perturbations by ringing like a bell. The associated characteristic frequencies (known as quasinormal frequencies) are complex, representing behaviour that is both oscillatory and decaying. I will present recent work examining the related spectral problem for a large class of black holes. I will also connect these results to related problems in scattering on asymptotically hyperbolic manifolds.