Séminaire : Problèmes spectraux en physique mathématique

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

Programme du lundi 8 avril 2019, en **salle 314** (3e étage)

— 11h15 - 12h15 : **Victor Kleptsyn** (Rennes)
Furstenberg theorem : now with a parameter !

For a random product of i.i.d. matrices A_i, randomly chosen from $SL(2, R)$, $T_n = A_n ... A_2 A_1$, the classical Furstenberg theorem states that the norm of such a product almost surely grows exponentially in n.
What happens if each of these matrices $A_i(s)$ depends on an additional parameter s, and hence so does their product $T_n(s)$? For each individual s, the Furstenberg theorem is still applicable. However, what can be said almost surely for the random products $T_n(s)$, depending on a parameter ? In particular, what can be said about the limit (Lyapunov exponent) $\lim_n (1/n) \log \|T_n(s)\|$? Does it exist for all (and not only almost all) parameter values s ?
Under a few (physically reasonable) assumptions, we show that :
– "For the limsup, everything is OK". Almost surely, for all parameter values, the upper Lyapunov exponent equals the Furstenberg one. This can be considered as a dynamical analog of the result by Craig and Simon from spectral theory.
– "Sometimes, the limit does not exists". However, in the no-uniform-hyperbolicity parameter region, there exists a dense subset of parameters, where the lower Lyapunov exponent vanishes.
– "The disaster is limited". Almost surely there is a zero Hausdorff dimension (random) set in the space of parameters, outside which the Lyapunov exponent exists and equals to the Furstenberg one.
This theorem is proven via a geometric description of the ("highly probable") behavior of finite-length products ; these results are applicable to the setting of the one-dimensional Anderson localization, providing a purely dynamical viewpoint on its proof.
This is a joint work with Anton Gorodetski.

— 14h - 15h : **Marco Falconi** (Tübingen)
Quasi-Classical Dynamics

Quasi-classical systems are physical systems combining a quantum and a classical part, often used to model the interaction between matter and radiation (or other forces). The quantum part is seen as an open system, that is subjected to the macroscopic force field, seen as an environment. Typical examples are Magnetic Laplacians, atoms in a (harmonic) trap, and optical lattices. In this talk, I will introduce quasi-classical systems from a mathematical standpoint, and discuss their derivation from more fundamental, but complicated, quantum systems.
The talk is based on a joint work with M. Correggi and M. Olivieri.

— 15h15 - 16h15 : **Emmanuel Schenck** (Paris-Nord)
Séparations exponentielles dans le spectre des longueurs

Sur une variété riemannienne compacte de courbure négative, il en général difficile de contrôler précisément la distribution locale des longueurs des géodésiques fermées, ce qui est un obstacle dans les problèmes spectraux qui utilisent la trace du groupe des ondes. On présentera dans cet exposé un résultat de densité pour des métriques avec de bonnes propriétés de séparations dans leur spectre de longueurs, et une application possible pour la loi de Weyl sur les surfaces.

Pour tout renseignement :
`https://www.math.u-psud.fr/~nonnenma/tournant/seminairetournant.html`