Séminaire N. Bourbaki

SAMEDI 29 JANVIER 2022

Institut Henri Poincaré (amphi. Hermite)
11 rue Pierre et Marie Curie, 75005 Paris

10h00 Alexandros ESKENAZIS
Average distortion embeddings, nonlinear spectral gaps, and a metric John theorem, *after Assaf Naor*

In this lecture we shall discuss some geometric applications of the theory of nonlinear spectral gaps. Most notably, we will present a proof of a deep theorem of Naor asserting that for any norm $\|\cdot\|$ on $\mathbf{R}^d$, the metric space $(\mathbf{R}^d, \sqrt{\|x-y\|})$ embeds into Hilbert space with quadratic average distortion $O(\sqrt{\log d})$. As a consequence, we will deduce that any n-vertex expander graph does not admit a O(1)-average distortion embedding into any $n^{o(1)}$-dimensional normed space.

11h30 Ursula HAMENSTADT
Local marked length spectrum rigidity,
after Colin Guillarmou and Thibault Lefeuvre

The marked length spectrum rigidity question asks whether two closed negatively curved manifolds M, N are isometric if they are homeomorphic with a homeomorphism which maps a closed geodesic on M to a curve on N which is freely homotopic to a closed geodesic of the same length. The lecture discusses the work of Guillarmou and Lefeuvre who used novel tools from microlocal analysis to give an affirmative answer to a local version of this question.

14h30 Philippe MICHEL
Recent progress on the subconvexity problem

The subconvexity problem aims at providing non-trivial (ie. subconvex) bounds for central values of automorphic L-functions; the main conjecture in this area is the Generalized Lindeloef Hypothesis which itself is a consequence of the Generalised Riemann Hypothesis. This lecture will survey several advances that have been made on this question during the past ten years : these include the delta-symbol approach of R. Munshi, the Weyl type bounds of I. Petrow and M. Young (both use the Dirichlet L-series representation of the central values) and the work of P. Nelson and A. Venkatesh (who use the automorphic period representations for the central value).

16h00 Galina PERELMAN
Finite time blow up for the compressible fluids and for the energy supercritical defocusing nonlinear Schrödinger equation,
after Frank Merle, Pierre Raphaël, Igor Rodnianski and Jérémie Szeftel

This talk addresses the problem of singularity formation in solutions of the 3D compressible barotropic Navier-Stokes equation and of the energy supercritical defocusing nonlinear Schrödinger equation. I will explain the recent results of F. Merle, P. Raphaël, I. Rodnianski, and J. Szeftel that link this problem to the compressible Euler dynamics showing that in some range of parameters both models admit finite time blow up solutions governed by appropriate self-similar solutions of the underlying Euler equation. While for the compressible Navier-Stokes equation the existence of finite time blow up solutions was already known, for the nonlinear Schrödinger equation this is the first result of formation of singularities in the defocusing case.