Séminaire Bourbaki du vendredi

VENDREDI 27 MARS 2026

Institut Henri Poincaré (amphithéatre Charles Hermite)
11 rue Pierre et Marie Curie, 75005 Paris

14h00   Tere SEARA
An introduction to geometric methods in Arnold Diffusion : The Arnold Example

In this seminar, I will provide an overview of the so-called geometric methods in Arnold diffusion. Arnold diffusion occurs in perturbations of integrable systems. In such systems, when written in action-angle variables, the action does not evolve under the flow (it is a first integral of motion). Roughly speaking, a system undergoes Arnold diffusion when, for arbitrarily small "typical" perturbations, the change in actions becomes of order one (independent of the parameter values). Several methods have been used to detect this phenomenon. In this talk, we will review the geometric methods, introducing concepts such as Normally Hyperbolic Invariant Manifolds (NHIM) and their stable and unstable manifolds. When these manifolds intersect along a "homoclinic channel", one can define the "Scattering map", which encodes the heteroclinic connections between points on the NHIM. By combining iterations of the Scattering map with the internal dynamics of the NHIM, we will find "pseudo-orbits" along which the action increases. These orbits will be followed by real orbits where the action also increases. Finally, we will apply this methodology to the famous example provided by Arnold in 1964.

15h30   Jochen HEINLOTH
Some background for the geometric Langlands correspondence

The Langlands correspondence was originally formulated as a conjectural link between representations of Galois groups of number fields and automorphic data. Translating these conjectures into statements for function fields of curves many of the objects admit natural geometric interpretations and the geometry then helps to prove results. For example some expected invariance properties of functions turned into descent properties of sheaves that sometimes follow from topological considerations. In this talk we will try to give some background on the first examples (GL_1 and GL_2) where this had been observed first by Deligne and Drinfeld and introduce some of the structures that occur in the more general results.

17h00 Hervé PAJOT
Jeunesse du problème de Kakeya et quelques questions de géométrie dans le plan complexe

En 1917, Kakeya demandait quelle est l'aire minimale pour retourner une aiguille. Au même moment, pour résoudre un problème d'analyse réelle, Besicovitch démontrait qu'il existait des ensembles d'aire nulle qui contiennent une droite dans chaque direction. Le problème initial de Kakeya était résolu, mais le problème est devenu : quelle est la dimension d'un ensemble contenant une droite dans chaque direction dans l'espace euclidien de dimension n ? Nous expliquerons la solution pour $n = 2$, et le lien entre ce problème et diverses questions en analyse harmonique, équations aux dérivées partielles, analyse complexe, théorie géométrique de la mesure, ... En particulier, nous verrons le lien avec des problèmes "simples" de géométrie du plan, non résolus.