Speaker: Vadim Kaloshin, University of Maryland

Title: Arnold diffusion via invariant cylinders and Mather variational method

Abstract:

The famous ergodic hypothesis claims that a typical Hamiltonian dynamics on a typical energy surface is ergodic. However, KAM theory disproves this. It establishes a persistent set of positive measure of invariant KAM tori. The (weaker) quasi-ergodic hypothesis, proposed by Ehrenfest and Birkhoff, says that a typical Hamiltonian dynamics on a typical energy surface has a dense orbit. This question is wide open.

In early 60th Arnold constructed an example of instabilities for a nearly integrable Hamiltonian of dimension $n>2$ and conjectured that this is a generic phenomenon, nowadays, called Arnold diffusion. In the last two decades a variety of powerful techniques to attack this problem were developed. In particular, Mather discovered a large class of invariant sets and a delicate variational technique to shadow them. In a series of preprints: one joint with P. Bernard, K. Zhang and two with K. Zhang we prove Arnold's conjecture in dimension $n=3$. 