

## Stochastic Arnold diffusion of deterministic systems

Vadim Kaloshin, University of Maryland

In 1964 V. Arnold constructed an example of nearly integrable deterministic system exhibiting instabilities. In the 1970s physicist B. Chirikov coined the term for this phenomenon "Arnold diffusion", where diffusion refers to stochastic nature of instability. One of most famous example of stochastic instabilities for nearly integrable systems is dynamics of Asteroids in Kirkwood gaps in the Asteroid belt. They were discovered numerically by astronomer J. Wisdom. During the talk I describe a class of nearly integrable deterministic systems with stochastic diffusive behavior. Namely, we show that each system from this class has a probability measure  $\mu$  in the phase space such that the distributions given by the deterministic evolution  $\mu_t$  of  $\mu$  converge to an Ito diffusion process. This result is conceptually different from all known mathematical results, where existence of "diffusing orbits" is shown, while here we study evolution of probability measures.

This work is based on series of papers written in collaboration with O. Castejon, M. Guardia, J. Zhang, K. Zhang.