Spring 2016

Mathematical Sciences Colloquium/RTG Seminar

Reversal times in a low-damping ferromagnetic model

A large variety of observable phenomena are mathematically described as transitions between metastable states in a system with many degrees of freedom, such as magnetization reversals. Metastability refers the system spending extended periods of time relative to its natural time scale in localized regions of phase space, transiting infrequently between them. As a toy system for a nanomagnet, I investigate a Langevin equation which limits to a stochastic partial differential equation as the dimension goes to infinity. Consistent with an energy barrier viewpoint, I show how time-scale separation averaging can be used to describe mean transition times in a low-dimensional, low-damping, regime. For the infinite dimensional system, I show how metastability can be explained by an entropic barrier in phase space, despite transition times remaining exponential with the energy barrier height. The difference lies in the prefactor in front of the exponential term, and depend on an effective dimension of the system.

Speaker: Katie Newhall

(UNC)

Thursday, February 25, 2016
(Joint with RTG)

Time: 4:00 – 5:00 PM

Location: AE214

Host: Gregor Kovacic

Rensselaer