

数学与系统科学研究院

计算数学所学术报告

报告人: **Prof. Molei Tao**

( *Georgia Institute of Technology* )

报告题目:

**Hyperbolic periodic orbits, heteroclinic connections, and semi-analytical characterization of rare events in some nongradient systems**

邀请人: 洪佳林 研究员

报告时间: **2018 年 7 月 15 日 (周日)**

**下午 16:00-17:00**

报告地点: 数学院南楼二层

**222 教室**

## **Abstract:**

We consider dynamical system perturbed by small Gaussian noises, with a goal of quantifying how noises can affect the dynamics. More precisely, most likely noise-induced metastable transitions are understood by maximizing transition rate provided by Freidlin-Wentzell large deviation theory. Such transitions in gradient systems (i.e., non-equilibrium statistical mechanics modeled by reversible diffusion processes) were understood and known to cross separatrices at saddle points. We instead investigate nongradient systems (possibly irreversible) using a developed tool of (generalized) orthogonal decomposition. Two examples will be described: (1) A different type of transitions, which cross hyperbolic periodic orbits, will be discussed. Corresponding numerical tools for both identifying such periodic orbits and computing transition paths will be developed. (2) The Langevin model of stochastic mechanical systems will be investigated and extended, with emphasis on how its metastable transition can differ from the overdamped (reversible) case. In addition, numerical approaches for general nongradient systems will be presented. If time permits, I will also mention how these results can help design control strategies.

**欢迎大家参加！**