



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

学术报告

- Title:** Numerical Modeling of Accretion Disks: A Journey with Magnetorotational Instability
- Speaker:** Dr. Xuening Bai
(*Harvard-Smithsonian Center for Astrophysics*)
- Time:** 10:30am, Monday, July 8, 2013
- Venue:** Conference Hall 322, Science Building, Tsinghua University

Abstract

Accretion disks are ubiquitous in astrophysical systems, and are of fundamental importance for studying the formation and evolution of a wide range of astrophysical objects. Accretion requires efficient outward transport of angular momentum, with the most powerful mechanism being the turbulence generated by the magnetorotational instability (MRI). Characterizing the physical properties of the MRI turbulence requires large magnetohydrodynamic (MHD) simulations. Over the past two decades, significant progress has been made, yet many open questions still remain. I will review the basic results as well as the most recent progress on the numerical study of the MRI, divided into three categories: local simulations without vertical stratification, local simulations including vertical stratification, and global simulations. Additional physics such as non-ideal MHD effects with applications to protoplanetary disks will also be briefly discussed. Simulation results highlight the importance of large-scale magnetic flux and its coupled evolution with accretion disks.