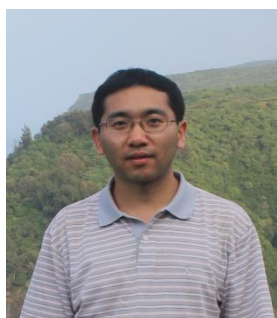


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Numerical Modeling of Accretion Disks: A Journey with Magnetorotational Instability

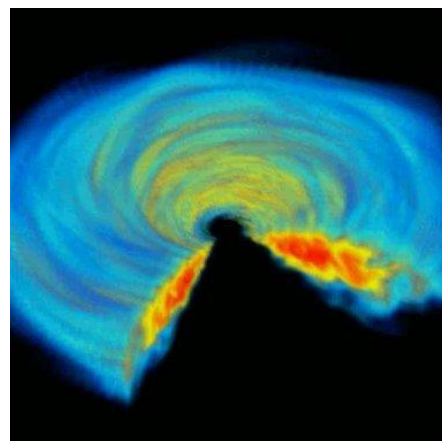


Dr. Xuening Bai (CfA, Harvard)

Dr. Xuening Bai (白雪宁) is a Hubble Fellow at Harvard-Smithsonian Center for Astrophysics. He is broadly interested in theoretical topics in planetary and high energy astrophysics, including planet formation, accretion disks and disk winds, pulsars and cosmic-ray acceleration. Majority of his research involves development of computational tools and MHD simulations. Dr. Bai obtained his BS from Tsinghua University in 2007, and PhD from Princeton University in 2012 before moving to Harvard.

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.



All are welcome! Tea, coffee, biscuits will be served at 2:15 P.M.

You are welcome to nominate speakers to Weimin Yuan (wmy@nao.cas.cn), Mei Zhang (zhangmei@bao.ac.cn), Licai Deng (licai@bao.ac.cn), Xuelei Chen (xuelei@cosmology.bao.ac.cn), Shude Mao (smao@nao.cas.cn)