

国台学术报告 NAOC COLLOQUIUM

2013 年 第 04 次 / Number 04, 2013

TIME: Wednesday, 10:00 AM, Jan. 16, 2013 **LOCATION: A601 NAOC**

Exciting Waves and Oscillations in Black-Hole Accretion Disks and other Rotating Astrophysical Flows

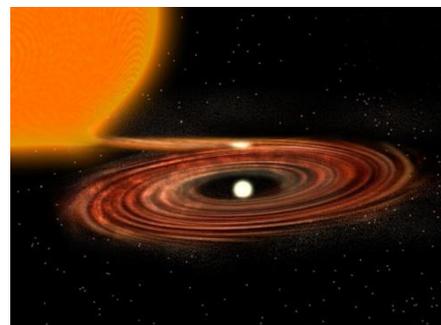


Dr. Dong Lai (Cornell University)

Dr. Dong Lai is a Professor of Astronomy at Cornell University. He obtained his Ph.D. in theoretical astrophysics from Cornell University in 1994, and was a Richard C. Tolman postdoctoral fellow at Caltech. In 1997, he joined the faculty of the Astronomy Department at Cornell, where he is now a full Professor. He was an A.P. Sloan research fellow and received teaching prize from Cornell. He has held visiting appointments at Institute for Advanced Study, Kavli Institute for Theoretical Physics, CITA, etc. His current research focuses compact objects (black holes, neutron stars and white dwarfs), exoplanets and astrophysical fluid dynamics in general.

Abstract

The physical origin of High-Frequency Quasi-Periodic Oscillations (HFQPOs) in black-hole X-ray binaries remains an enigma despite many years of detailed observational studies. Similar oscillations have also been seen in AGNs and intermediate-mass black hole candidates. Although there exists a number of "models" for HFQPOs, many of these are simply "notions" without actual calculation derived from disk fluid physics. Future progress requires a combination of numerical simulations and semi-analytic studies to extract physical insights. I will discuss recent works on global oscillation modes in black-hole accretion disks, and explain how, with the help of general relativistic effects, the energy stored in the differential rotation of the disk can be pumped into global spiral density waves/modes, making these modes grow naturally to large amplitudes under certain conditions. The computed properties of these oscillation modes are consistent with the observations of HFQPOs in BH X-ray binaries. The connection of HFQPOs with other disk properties (such as production of episodic jets) will also be discussed. The underlying physics of spiral wave excitations is applicable for other astrophysical disk systems.



All are welcome! Tea, coffee, biscuits will be served at 9:45 A.M.

You are welcome to nominate speakers to Weimin Yuan (wmy@nao.cas.cn, Jan-Mar), Mei Zhang (zhangmei@bao.ac.cn, Apr-Jun), Licai Deng (licai@bao.ac.cn, Jul -Sep), Xuelei Chen (xuelei@cosmology.bao.ac.cn, Oct -Dec).