

You are welcome to nominate speakers to colloquium@nao.cas.cn. The video and slide of previous colloquia and more information can be found at <http://colloquium.bao.ac.cn/>.

国台学术报告 NAOC COLLOQUIUM

2015 年 第 06 次 / Number 06 2015

Time: Wednesday 2:30PM, Feb. 11 Location: A601 NAOC

General Polytropic Dynamic Collapses/Outflows under Self-gravity: from Hypermassive Black Holes to Brown Dwarfs and Gaseous Planets

Prof. Yu-Qing Lou (Tsinghua University)



Dr. Yu-Qing Lou is a Cheung Kong professor at Department of Physics, Tsinghua University. He got his PhD from Harvard University in 1987. Then he worked as a postdoc researcher at National Center for Atmospheric Research, and University of Alaska. From 1991 through 2002, he was the research scientist at University of Chicago, and joined Tsinghua as a Bairen Professor since 2002. His main research interests include theoretical and computational investigations of solar space, magnetospheric, stellar, galactic, pulsar and galaxy cluster astrophysical fluid dynamics and relativistic magneto-hydrodynamics. He has published over 130 refereed papers including several on Nature and Science magazines.

Abstract

We present theoretical formulations of spherical hydrodynamics and quasi-spherical magneto-hydrodynamics (MHD) for general polytropic fluids under self-gravity. We demonstrate basic features and properties of various nonlinear self-similar dynamic solutions including possible expanding and converging shocks. Important astrophysical applications include: Hypermassive Black Holes of 10 to 1000 billion solar masses in the Universe, $M - \sigma$ and $M - \text{bulge}$ mass relations for Supermassive Black Holes in galactic bulges and elliptical galaxies, Intermediate Mass Black Holes in globular clusters, converging and rebound shocks during supernova explosions, hyperintense magnetic fields of magnetars, forming stars in magnetized molecular cloud cores, forming brown dwarfs and gaseous planets in magnetized mini gas globules. Stability analyses are also performed; unstable internal gravity modes and vorticity modes are particularly highlighted in contexts of collapsing core convection and turbulence as well as for gravitational wave emissions.



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