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国台学术报告 NAOC COLLOQUIUM

2014 年 第 39 次 / Number39 2014

Time: Wednesday 2:30PM, Oct. 08 Location: A601 NAOC

Magnetic Interaction between close in Planets and their Host Stars

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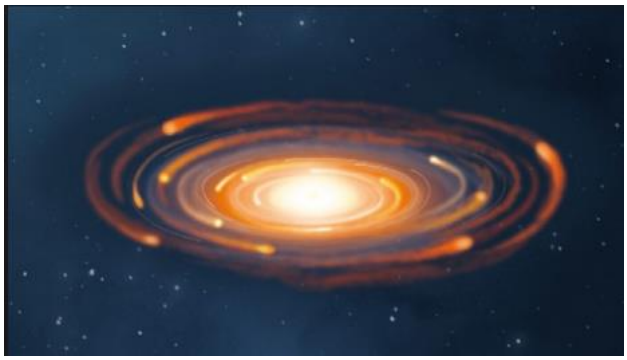
Dr. Doug Lin is a Professor of Astronomy and Astrophysics at the University of California, Santa Cruz, and served as the founding director of the Kavli Institute for Astronomy and Astrophysics at Peking University, and currently is a visiting professor at the Institute for Advanced Studies, Tsinghua University. He earned his B.S. from McGill University and his Ph.D. in astronomy and astrophysics from Cambridge University. He joined the UCSC faculty in 1979. Lin is renowned for his research in astrophysics, which has focused on understanding the formation and evolution of stars and planets. He has made significant contributions to the physics of disks of matter orbiting around a central mass, such as Saturn's rings, spiral galaxy disks, and the accretion rings around black holes that power quasars. He has received a number of awards in his scientific career. He is an honorary fellow of the Royal Astronomical Society, and a member of the American Academy of Arts and Sciences. In 2008, he received the Outstanding Faculty Award from the UCSC Division of Physical and Biological Sciences. In 2014, he was bestowed with the Brouwer award by the American Astronomical Society.

Abstract



A population of planets with masses and sizes ranging from the Earth to Jupiter have been discovered in the proximity of their host stars. Their formation and evolution are subjected to the influence of intense stellar fields during their infancy. I discuss four relevant issues including: 1) the destiny of their migration near the magnetospheric cavity of their natal disks, 2) the stellar spin - planetary orbit obliquity caused by the torque exerted by misaligned stellar magnetosphere onto the natal disks and planets, 3) the Ohmic dissipation in and mass loss from planets which encounter time-dependent field, and 4) the unipolar induction and Lorentz torque induce by planets' non-synchronous orbits through the stellar magnetic field. I show that these effects have direct observational implications on planets' mass-semi major axis distribution,obliquity distribution, composition and internal structure. We apply this theory to a recently discovered ultra short-period planet around an active star and deduce the planetary mantle is composed mostly of molten rocks and its interior may be differentiated with an iron core. This structural study indicates a promising future for comparative planetology.

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