



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

Astrophysics Seminar

Title: Wind mass transfer in AGB binaries

Speaker: Dr. Zhuo Chen (*Univ. Of Alberta*)

Time: 2:00pm, Tuesday, June 4, 2019

Venue: Conference Hall 213, Science Building, Tsinghua University

Abstract

Wind mass transfer in AGB binary systems is poorly understood despite its importance in low-mass binary evolution. Many observable objects such as planetary nebulae and carbon-enhanced-metal-poor stars can be better understood if we have a realistic picture of wind mass transfer. Wind mass transfer, if results in a high accretion rate, can also lead to a merger of the binary. To illustrate the wind mass transfer process, we study the binary system that consists of an asymptotic-giant-branch (AGB) star and a companion star. We carry out 3-D radiation-hydrodynamic (RHD) simulations of AGB binaries that transfer mass through wind-Roche-lobe-overflow (WRLOF) and Bondi-Hoyle-Littleton (BHL) accretion. Our 3-D RHD model solves the radiative transfer by the ray-tracing method in an adaptive spherical coordinate. We also consider the optically thin cooling of HII, HI, H₂, CO, and H₂O by solving Saha's equations. Simulation results show that circumbinary disk or spiral structure outflow may be found in different configurations of the binary systems. Accretion disk could form around the companion. We will discuss the potential importance of chemistry and phase transition of gases in the evolution of AGB binaries.

