



# 清华大学高等研究院

Institute for Advanced Study, Tsinghua University

## 学术报告

**Title:** Dynamics of Dust-Gas Interactions in Protoplanetary Disks and Implications for Planetesimal Formation

**Speaker:** Dr. Hui Li  
*Los Alamos National Laboratory*

**Time:** 2:00pm, Thursday, September 28, 2017

**Venue:** Conference Hall 322, Science Building, Tsinghua University

### Abstract

The majority of young low-mass stars are surrounded by disks, consisted of large reservoirs of gas and dust out of which planetary systems eventually form. In the recent years, high spatial resolution observations of such disks by ALMA have revealed many details that are providing interesting constraints on the disk physics as well as dust dynamics, both of which are essential for understanding planet formation. We carry out high-resolution, two-dimensional hydrodynamic simulations of global disks, including the effects of dust feedback. We find that disks display a rich variety of behaviors, depending on the mutual interactions of dust and gas. These features include both the quasi-axisymmetric rings and non-axisymmetric dust traps which are unstable to several possible instabilities. We also show for the first time the effects of streaming instability in global disk simulations. These effects are providing a promising new way to promote the formation of many planetesimals in such disks. We produce synthetic dust emission images using our simulation results and discuss the comparison between simulations and observations.