

Polynomial Tail Solutions of the Boltzmann Equation

Date

2026
May 11 & May 12
16:00-17:30

Venue

R505, NCTS
Cosmology Bldg.

Speaker _____

Renjun Duan

The Chinese University of Hong Kong

Organizer _____

Chun-Hsiung Hsia

National Taiwan University

Introduction _____

This course is to introduce the mathematical theory on the solutions of the Boltzmann equations and to consider the decay analysis.

Outline & Descriptions

In the lectures, we first revisit Caflisch's decomposition of the Boltzmann equation and combine it with spectral analysis and energy estimates to construct global Boltzmann solutions close to equilibrium, featuring slow velocity decay in the case of the whole space. Both cutoff and non-cutoff scenarios will be considered within different functional frameworks.

Second, we examine non-equilibrium solutions to the Boltzmann equation with shearing effects, where slower polynomial velocity decay becomes a crucial characteristic of the solutions. The long-term dynamics under shearing depend on the type of intermolecular interaction potentials, and we analyze both Maxwell molecules and hard potentials. Third, we explore the initial-boundary value problem for the Boltzmann equation in the context of Couette flow, considering both finite and vanishing Knudsen numbers. Finally, we discuss several problems related to these topics.

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