THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON APPLIED MATHEMATICS

Macroscopic modeling and simulations for two-phase flows with moving contact lines

By

Prof. Xianmin XU
Chinese Academy of Sciences

Abstract

Modeling and simulating two-phase flows with moving contact lines pose significant challenges in fluid dynamics due to the problem's multi-scale and multi-physics nature. A continuum model must consider the nanoscale slipness near a contact line. While there are numerous microscopic models available, applying them to macroscopic two-phase flow problems is extremely difficult, especially when dealing with rough or chemically inhomogeneous solid boundaries. In this presentation, I will discuss recent progress in modeling and simulations for complex moving contact line problems. Specifically, I will demonstrate the effectiveness of utilizing the Onsager variational principle as a powerful approximation tool. We derive coarse-grained boundary conditions for moving contact line problems, both with and without contact angle hysteresis. These boundary conditions serve as the foundation for developing efficient numerical methods to solve macroscopic two-phase flow problems.

Date   : **4 September 2023 (Monday)**
Time   : **3:00pm ***
Venue : **Room 3598 (Lifts 27/28)**

All are Welcome!