Modeling and Simulation of Three-phase Flow with Moving Contact Line Problem

(Talk #35)

Qian Zhang*, Xiao-Ping Wang

Department of Mathematics, The Hong Kong University of Science and Technology,

Hong Kong

*Email of Presenting Author: qzhangxd@gmail.com

A Cahn-Hilliard coupled Navier Stokes equation together with the boundary condition on solid surfaces is proposed. The energy decay of the model is satisfied. An unconditional stable numerical scheme is then designed to solve the equation system we derive for the three phase flow with moving contact line problem. The discrete energy law of the numerical scheme is proved. Two numerical examples are presented to validate the capabilities of our model and numerical schemes. The idea we are using could be extended to the modeling of other physical problems or biological problems which could be considered as driven by minimum of energy functional with several constraints.