



The Hong Kong Polytechnic University **Department of Applied Mathematics**

Colloquium

Modeling and numerical methods for two-phase flows in superposed free flow and porous media

By

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Abstract

In this talk we introduce a diffuse interface model for two-phase flows in superposed free flow and porous media. The model consists of the Cahn-Hilliard-Navier-Stokes equations in free flow and the Cahn-Hilliard-Darcy equations in porous media coupled through a set of domain interface boundary conditions. We establish global existence of weak solutions as well as weak-strong uniqueness. We then present a first-order decoupled unconditionally stable numerical method for solving the model. Finally we discuss recent progress in the design of super convergent hybridizable discontinuous Galerkin method for solving the Cahn-Hilliard type equations.

Bibliography

Prof. Han Daozhi obtained his PhD in Applied and Computational Mathematics from Florida State University in 2015. He was a Zorn Postdoctoral Fellow at Department of Mathematics, Indiana University. He is currently an assistant professor at Department of Mathematics and Statistics, Missouri University of Science and Technology. Prof. Han's research interests are applied analysis and numerical simulations of partial differential equations from fluid mechanics. His research has been supported by the National Science Foundation, the Simons Foundation, and the Material Research Center of MS&T.

Date: 22 March 2022 (Tuesday) Time: 10:00-11:00 (Hong Kong Standard Time GMT +8) Venue: Online Talk via Zoom (Meeting ID: 966 2972 4537) Speaker: Prof. Daozhi Han, Missouri University of Science and Technology Host: Dr. Buyang Li, The Hong Kong Polytechnic University Click to join: https://polyu.zoom.us/j/96629724537?pwd=cTFWc3B1dWxlb1VYR013Vk1oN0FYQT09



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