

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

Colloquium

Multiscale Modeling and Simulation for Semiconductor Materials and Quantum Devices

By

**Prof. Liqun CAO
Chinese Academy of Sciences**

Abstract

In this talk, we will introduce our recent advances in multiscale modeling and simulation for semiconductor materials and quantum devices. We first talk about some important multiple scale transport equations from classical to semiclassical, and then to quantum models, e.g., drift-diffusion (DD) equations, hydrodynamic equations, Boltzmann transport equation (BTE), quantum hydrodynamics, quantum-kinetic (Liouville, Wigner-Boltzmann) equation, Green's functions method and so on. Second, we focus on discussing the algorithms and the related theoretical results for the BTE in semiconductor materials and devices with multi-valley. Third, we will discuss the multiscale algorithm and analysis for the Schrödinger-Poisson system with rapidly oscillating discontinuous coefficients. Finally, some typical applications in semiconductor materials and quantum devices such as GaAs, graphene and MOSFET are advanced. This talk is based on the joint work with Jiachuan Cao and Yiwei Wang



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Date: 28 June 2022 (Tuesday)

Time: 14:00-15:00 (Hong Kong Standard Time GMT +8)

Venue: Online Talk via Zoom (Meeting ID: 967 4768 1841)

Speaker: Prof. Liqun Cao, Chinese Academy of Sciences

Host: Prof. Zhonghua Qiao, The Hong Kong Polytechnic University

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<https://polyu.zoom.us/j/96747681841?pwd=N1ZHSdCZis5VUFXTeljRktXWFJlVUT09>

***** ALL ARE WELCOME *****

For enrolment, please send your name and email to wai-yan.moon@polyu.edu.hk on or before 27 June 2022