

数学与系统科学研究院

计算数学所学术报告

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报告题目:

Experimental Study of the Interfacial Dynamics using Atomic Force Microscopy

邀请人: 许现民副研究员

报告时间: 2017 年 12 月 22 日(周五)

下午 14:00--15:00

报告地点: 数学院科技综合楼

三层 305 会议室

报告摘要:

Compared to the bulk properties of material, our fundamental understanding of the interactions and dynamics at the liquid-air, liquid-solid, and even solid-solid interfaces are still very limited. The lack of

progress is partially because the interfacial interactions are extremely sensitive to the nanoscale distance at which the measurements are made, and the interfacial dynamics are easily disturbed by defects and impurities at the interface. In this talk, I present the development of new Atomic Force Microscopy (AFM) techniques and their applications in the investigation of the contact line dynamics and cell mechanics.

In the first experiment, we carry out direct AFM measurements of capillary force hysteresis and relaxation of a circular moving contact line (CL) formed on a long micron-sized glass fiber intersecting a liquid-air interface. The experiment demonstrates that the pinning (relaxation) and depinning dynamics of the CL can be described by a common microscopic framework, and the advancing and receding CLs are influenced by two different sets of relatively non-wetting and wetting defects on the fiber surface.

In the second experiment, we conduct a mechanical measurement on living cells and tissues using AFM.

We find the elastic modulus obtained from the Hertz model has a weak power law dependence on the probe indentation speed. The measured force-relaxation curves at a constant strain exhibit two distinct behaviors with an exponential decay in the short time regime followed by a power-law decay in the long time regime. Proper mechanical model is urgently needed to understand the interesting phenomena in the living systems.

About the speaker: Dr. Dongshi Guan received his BSc in Physics from Beijing Normal University (BNU) in 2010 and his PhD in Physics from the Hong Kong University of Science and Technology

欢迎大家参加！