

The 207th

MANA Special Seminar



SURFACE FORCES MEASUREMENT FOR NANO-MATERIALS SCIENCE

Chair: Dr. Kohei Uosaki (MANA PI)

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One of important challenges in advanced materials science is bridging a gap between nano-materials science and real materials. This paper describes how the surface forces measurement can be used for new materials technology based on nano- and meso-scopic molecular science.

Molecular and surface interactions are ubiquitous in molecular science including biology. Surface forces measurement and atomic force microscopy (AFM) have made it possible to directly measure molecular and surface interactions in liquids as a function of the surface separation with high sensitivity. Naturally, they have become powerful tools for studying origins of forces operating between molecules and/or surfaces of interest. They also offer a unique, novel surface characterization method, which “monitors surface properties changing from the surface to the bulk (depth profiles)” and provides new insights into surface phenomena.

“Force-distance” curves should be utilized for studying a wider range of phenomena including adsorption, surface charge and liquid structuring. Taking an advantage from ability of the surface forces apparatus to regulate the surface separation with a high resolution, various shear measurements have been developed for studying nano-rheological and nano-tribological properties of confined liquids. This paper is to demonstrate the potential of the surface forces measurement as a novel mean for investigating surfaces, complex soft systems and confined liquids, which are important in the current advanced materials research. Our recent studies on polyelectrolyte brushes, surface molecular clusters, resonance shear measurements are described as well as the novel surface forces apparatus for opaque samples.

Venue: Seminar Room #431, MANA Bldg.

Date: June 3rd (Friday)

Time: 14:00-15:00

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