Satyendra Nath Bose National Centre for Basic Sciences

Azadi Ka Amrit Mahotsav

Visitor, Associates and Students' Programme (VASP) presents Webinar Series on Statistical Mechanics

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TITLE

The equation of state of randomly driven colloids

ABSTRACT

In thermal equilibrium, the equation of state of a dilute colloidal suspension is similar to that of an ideal gas, where pressure is replaced by the osmotic pressure. For active colloidal particles, it was shown that one can define an effective temperature that captures the barometric density profile created in a sedimentation experiment. An effective pressure can also be defined for active spherical colloidal particles from mechanical consideration. However, no experiment to date measured the two-state function independently and verified the predictive powers of an effective equation of state. Here we utilize holographic optical tweezers and numerical simulations to measure independently the osmotic pressure and the effective temperature of a driven colloidal suspension. We show that the ideal gas equation of state holds for randomly driven colloidal dispersions when the effective temperature and active osmotic pressure are used instead of the equilibrium.

SPEAKER

Professor Yael Roichman, *School of Chemistry, Tel Aviv University*

Professor Yael Roichman is a member of faculty in School of Chemistry and School of Physics and Astronomy in Tel Aviv University. After finishing her masters in Materials Engineering in 1997 from Technion, Israel, she completed her PhD in Physics in 2004 from Technion. From 2004 to 2008 she was a research assistant in New York University. She joined Tel Aviv University in 2008. She works in the field of experimental soft matter. Her group uses holographic optical trapping, microscopy and single particle tracking to study systems in the interface of biophysics, soft matter, and non-equilibrium statistical mechanics.