

ICTS Statistical Physics Journal Club Seminar

Title : Settling Dynamics and Flow Instabilities in Dense Shear-thinning Fluids

Speaker : Ranjini Bandyopadhyay (Raman Research Institute, Bengaluru)

Date : Thursday, 1st April 2021

Time : 03:00 pm (IST)

Abstract : I shall describe some recent table-top experiments that we have performed in our laboratory. In the first experiment, millimeter-sized steel balls are dropped in aqueous clay suspensions. We observe that balls of larger diameters fail to achieve terminal velocity over the entire duration of the experiment. We propose a toy model that correctly predicts the time-dependence of the ball velocity for a range of ball sizes and clay concentrations. In another experiment, we record and analyze the interfacial fingering patterns that emerge when a Newtonian fluid displaces aqueous cornstarch suspensions in a radial Hele-Shaw cell. Increasing the viscosity of the displacing fluid and the concentration-dependent elasticity of the outer viscoelastic fluid both lead to significant suppression of interfacial instabilities. By performing a linear stability analysis of the interface, we predict a dominant wavelength of interfacial perturbation that closely matches with the spacing between fingers measured experimentally at the onset of instability.

Venue : Please click on the link to join the meeting
<https://zoom.us/j/92784092384?pwd=b3dDbUt6Y2M4ZmNPaVJ6aVBQbjArUT09>
Meeting ID: 927 8409 2384
Passcode: 436959