ICTS Thesis Synopsis Seminar

Title : Mechanics of filaments and rigid particles: role of elasticity and hydrodynamic interaction

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Date : Wednesday, February 13, 2019

Time : 4:30 PM

Venue : Emmy Noether Seminar Room, ICTS Campus, Bang

Abstract : This talk is divided into two parts: the first part deals with the role of large deformation in the behaviour of elastic filaments and the second deals with the role of history force on dynamics of small particles in fluid flow.

Filaments are objects with one dimension much larger than the other two similar dimensions. Forces in the filament in the small deformation theory are linear in filament position and such a theory breaks down in several scenarios. Role of large deformation of filament centreline in naturally occurring phenomenon is a topic of current research. Here we discuss two examples, one where large local deformation affects measurable quantities such as contact angle of a droplet on a filament and one where large deformation introduced by geometry of substrate affects transition between filament morphologies.

Tiny particles in fluid flows leave behind a trail as they move and this trail, starting from its initial location affects its trajectory. The lagrangian equation for the particle motion thus involves a history force and this force has a singular kernel. We discuss a method to evaluate the history force without storing the entire particle trajectory and using this we find the implications the history force has on particle trajectory.