

Texas Tech University. Applied Mathematics Seminar.

Nonlinear phenomena in Stokes-flow regime

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Room: MA 016. Time: 4:00pm.

ABSTRACT. Microstructure of soft materials, such as emulsions, suspensions, and macromolecular systems can be strongly affected by hydrodynamic forces. The interplay between the microstructure and microhydrodynamics often involves complex nonlinear phenomena that occur in the Stokes-flow regime, even though the governing hydrodynamic equations are linear. Some of my recent results on the evolving nonequilibrium microstructure of soft materials in creeping flows will be presented. I will analyze similarities between the evolution of drops and macromolecules (e.g., DNA and disordered signaling proteins) in flows with rotation. Other cases will illustrate hydrodynamic mechanisms through which confining walls affect suspension dynamics, leading, for example, to stabilization of ordered structures. My examples will show that hydrodynamic forces are key to understanding soft matter dynamics.