

PHYSICAL MATHEMATICS SEMINAR

Dynamics of Bead Formation and Breakup in Weakly Viscoelastic Jets

AREZOO M. ARDEKANI

Department of Mechanical Engineering
Massachusetts Institute of Technology

ABSTRACT:

Understanding the instability and breakup of polymeric jets is important for a wide variety of applications including inkjet printing and spraying of fertilizers and paint. Such fluids are typically only weakly viscoelastic and the jetting/breakup process involves a delicate interplay of capillary, viscous, inertial and elastic stresses. We show that by understanding the physical processes that control different phases of the temporal evolution in the jet profile, it is possible to extract transient extensional viscosity information even for very low viscosity and weakly-elastic liquids. This is especially useful since filament-stretching and capillary breakup elongational rheometers face challenges for low-viscosity elastic polymer solutions. Finally, we computationally explore the range of operating conditions over which a jet can effectively be used to measure the transient extensional viscosity of the liquid.

TUESDAY, NOVEMBER 16, 2010

2:30 PM

Building 2, Room 105

Refreshments at 3:30 PM in Building 2, Room 290



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