PHYSICAL MATHEMATICS SEMINAR

Contact Droplet Deposition: Statics, Dynamics and the Failure of Continuum Mechanics

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ABSTRACT:

Contact droplet deposition is achieved when a small rod or needle is dipped into a viscous fluid, touched to a smooth substrate and then withdrawn. The size of the resulting drop left on the substrate turns out to be a surprisingly complex function of the fluid properties, needle dimension, retraction speed, and the detailed microscale physics of the moving contact line established between the liquid, gas and substrate. As an example by varying the retraction speed alone, droplet sizes ranging from several millimeters to a few microns in diameter can be achieved. We explore this system using analytical, numerical and experimental approaches that cover the full range of behavior from the static shape of the equilibrium liquid bridge, its instability and collapse to the nanoscale flow near the moving contact line.

TUESDAY, DECEMBER 14, 2010
2:30 PM
Building 2, Room 105

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

Massachusetts Institute of Technology