PHYSICAL MATHEMATICS SEMINAR

The Initial Dynamics of Droplet Impact

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ABSTRACT:

Before a falling drop can contact a solid surface, it must first drain the air beneath it. The widely accepted paradigm of a drop hitting a solid surface assumes immediate contact of the liquid followed by spreading of the contact line. However, recent theoretical calculations suggest that the air separating the drop from the surface fails to drain, and is instead compressed, deforming and flattening the bottom of the drop forming a pocket of air, which eventually leads to the formation of a trapped bubble of air within the drop. Surprisingly, the liquid is predicted to continue to rapidly spread laterally outwards over a layer of air as thin as a few tens of nanometers. However, these events occur at diminutive length scales and fleeting time scales; therefore, to visualize them we developed new imaging modalities that are sensitive to the behavior right at the surface and that have time resolution superior to even the very fastest cameras. I will present results that challenge the prevailing paradigm in which contact between the liquid and solid occurs immediately, and spreading is dominated by the dynamics of a single contact line.

TUESDAY, DECEMBER 2, 2014
2:30 PM
Building E17, Room 122

Reception following in Building E17, Room 401A
(Math Dept. Common Room)

http://math.mit.edu/pms/

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