# PHYSICAL MATHEMATICS SEMINAR

ACOUSTIC RIPPLES AND ELASTIC SPLASHES

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ABSTRACT:

The problem of the entry of an object into a quiescent fluid has a rich history (e.g. Worthington, Edgerton), but as the many recent studies have shown, there are still new things to see. I will discuss two experiments on deep and shallow impact. The entry of a solid sphere into a deep Newtonian fluid like water produces a cavity, and subsequently an entrained bubble, a splash, and an audible PLOP! We have found that this acoustic emission can lead to ripples on the bubble surface. A potential flow model explains these ripples as the rectification by the motion of the sphere of the gas oscillations in the bubble. On the shallow end, impact of a droplet into a thin fluid layer produces a beautiful crown if the two fluids are Newtonian, which is much suppressed in the viscoelastic case. We study a droplet of organic salt solution falling into a surfactant solution, two components which when combined form a highly viscoelastic wormlike micellar fluid. The developing elasticity of the splash competes with inertial effects to provide a novel combination of effects.
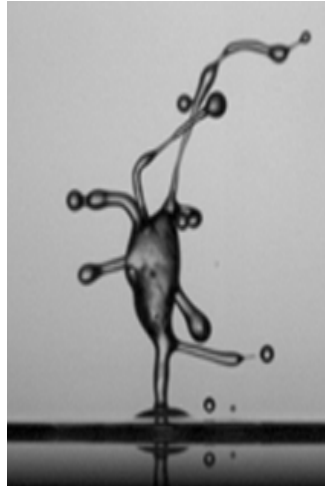
TUESDAY, APRIL 10, 2007
2:30 PM
Building 2, Room 146

Refreshments at 3:30 PM in Building 2, Room 349
(Applied Math Common Room)