

PHYSICAL MATHEMATICS SEMINAR

FLOW IN FILMS

ERNST van NIEROP

School of Engineering and Applied Sciences
Harvard University

ABSTRACT:

Films of fluid that are not bounded by a substrate, e.g. soap films or spreading floating viscous drops, exhibit rich dynamics. Two examples will be shown and discussed here, namely reactive spreading and recoil of a viscous drop of oil on water, and formation of films with aqueous polymer solutions. In the case of reactive spreading, chemistry at the interface speeds up the spreading dynamics, but the drops surprisingly recoil to their initial size. For the formation of films with polymer solutions we first review the existing literature on soap film formation, and show how these films can exhibit both extensional- or shear-like flows. Surface tension, surface viscosity, and Marangoni stresses all play a role. Recent experimental results from films of poly(ethylene oxide) (PEO) solutions show deviations from Frankel's law, as well as some novel thinning/thickening dynamics.

TUESDAY, APRIL 7, 2009

2:30 PM

Building 2, Room 105

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



Massachusetts Institute of Technology

Department of Mathematics
Cambridge, MA 02139