

PHYSICAL MATHEMATICS SEMINAR

DYNAMICS OF CRACKING GELS

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ABSTRACT:

I will present results from two sets of experiments on cracking in biogels such as agar or gelatin. An important feature of these gels is the ease with which we can tune the bulk modulus via the concentration of the gelling agent. In the first set of experiments, we observe cracking due the spreading of a droplet on the surface of a weak gel. We explore a range of gel strengths and droplet surface tensions and find that the onset of the instability and the number of arms depend on the ratio of surface tension difference to gel strength. Nonetheless, the cracks grows with an apparently universal law $L \sim t^{3/4}$. In addition, we are able to quantitatively visualize the crack profile through the use of light-scattering techniques. In the second set of experiments, we study two-crack interactions in a slab of gel. A crack propagates in the direction in which it will relieve the most stress; when two cracks propagate near each other, they attract each other. We observe a universal shape for the resulting paired cracks, with the length scale set by the initial crack separation.

TUESDAY, OCTOBER 28, 2008

2:30 PM

Building 2, Room 105

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

