Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Capillary wrinkling of a floating sheet under differential surface tension JIANGSHUI HUANG, Department of Physics & Department of Polymer Science and Engineering, University of Massachusetts Amherst, WIM H. DE JEU, Department of Polymer Science and Engineering, University of Massachusetts-Amherst, NARAYANAN MENON, Department of Physics, University of Massachusetts-Amherst, THOMAS P. RUSSELL, Department of Polymer Science and Engineering, University of Massachusetts-Amherst — We have previously studied the radial wrinkling of a thin polymer film floating on the surface of water under the capillary force exerted by a drop of water placed on its surface. Here, the same surface tension both sets the radial stress in the unperturbed film as well as the source of the perturbation that leads to the wrinkling instability. We now report the effect on the wrinkling instability of a differential surface tension by using fluids with different surface tensions for the liquid the film is floating on and the drop put on the film. We use both surfactants and a variety of pure liquids to control the surface tension of water. When the base radial stress of the the films floating was decreased, the length of the wrinkles increased, but the number of wrinkles decreased.

[1] Full reference here. Science 317, 650(2007)

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Date submitted: 25 Nov 2008 Electronic form version 1.4