

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Effects of Wetting on Instabilities of Thin Solid Films<sup>1</sup>** MARGO LEVINE, ALEXANDER GOLOVIN, Northwestern University — Effects of wetting interactions on instabilities of thin epitaxial solid films are studied. It is shown that wetting interactions between a film and the substrate suppress the long-wave modes of both Asaro-Tiller-Grinfeld instability and thermodynamic instability caused by anisotropic surface energy. This yields a short-wave instability spectrum that can lead to the formation of spatially-regular surface structures. Pattern formation in such systems is analyzed by means of weakly nonlinear analysis and numerical simulations of continuum evolution equations describing the film shape. It is shown that pattern formation in such systems is strongly affected by the presence of the Goldstone mode associated with the conservation of mass.

<sup>1</sup>Supported by NSF

Alexander Golovin  
Northwestern University

Date submitted: 30 Nov 2004

Electronic form version 1.4