

Abstract Submitted  
for the MAR05 Meeting of  
The American Physical Society

**Nonlinear dynamics of the thinning process of metallic nanocylinders**<sup>1</sup> JÉRÔME BÜRKI, University of Arizona, CHARLES A. STAFFORD, University of Arizona — A nonlinear partial differential equation for the shape evolution of metallic nanowires is presented and applied to the description of the thinning process of nanocylinders. Using concepts from fluid dynamics, the PDE is derived from a semiclassical energy functional that includes electron-shell effects. The thinning is found to occur through nucleation of kink-like solitons at the boundary of the nanowire, which subsequently move along the wire. We discuss a rich dynamics involving interactions between kinks that substantially alters their motion along the wire, and compare our results with experiments on gold nanowires.

<sup>1</sup>Work supported by NSF grant DMR0312028

Jerome Buerki  
University of Arizona

Date submitted: 30 Nov 2004

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