Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Combined Bending, Stretching, and Wrinkling of Thin Sheets
KATIA BERTOLDI, MICHAEL TAYLOR, Harvard university, BENNY DAVIDOVITCH, University of Massachusetts, Amherst — Thin elastic sheets develop surface undulations, or wrinkles, in the presence of small compressive strain. In recent years, interest in thin sheets has greatly increased due to their relevance in a wide array of applications such as biological tissues, integrated circuits and solar sails. As a result, wrinkling has recently attracted considerable attention among engineers, physicists and biologists. Although the most basic buckling instability of uniaxially compressed plates was understood by Euler more than two centuries ago, recent experiments and simulations have shown significant deviations from predictions. Motivated by this puzzle we investigate wrinkling in a thin sheet under axisymmetric loading conditions and systematically compare numerical and analytical solutions.

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Date submitted: 15 Nov 2013 Electronic form version 1.4