

Abstract Submitted  
for the MAR11 Meeting of  
The American Physical Society

**3D micro-modeling of wrinkling phenomena** DAMIEN EGGENSPIELER, GOZDE INCE, KAREN GLEASON, MARY BOYCE, MIT — Wrinkles, formed by the buckling of stiff layers adhering to soft substrates, are commonplace in nature. From wrinkles on smiling or aging faces to the wrinkled shape of pumpkins or the wrinkled electrospun nano-fibers due to the radial evaporation of the solvent used in the processing of these fibers, wrinkles have been found ranging from the nano- to the macroscopic scales. More recently, studies have shown that this buckling phenomenon can be directed via a selective stiffening of either ones of the layers composing this composite system. We are introducing a 3D numerical model for the buckling of a shell on a soft layer. The selective stiffening of the shell can reproduce the “stiffness patterning” obtained experimentally by UV-Ozone treatment of a soft PDMS substrate through a photomask. This model can predict the final shape of the surface of this composite system for periodic photomasks and might be used in the design of specific micro-topographies.

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Date submitted: 03 Jan 2011

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