

Abstract Submitted  
for the MAR06 Meeting of  
The American Physical Society

**Probing surface relaxation of polystyrene films using gold nanoparticles** ZAHRA FAKHRAAI, Physics Department, University of Waterloo, Waterloo, ON, N2L 3G1 Canada , JAMES A FORREST, Physics Department, University of Waterloo, Waterloo, ON, N2L 3G1 Canada — Polymer thin films are usually used to probe the confinement effects on the dynamics of glass former materials. Many studies show that the glass transition temperature of thin polymer films is decreased below bulk  $T_g$  for very thin films. There is evidence that this  $T_g$  reduction is due to the existence of a more mobile region near the surface of the film. However, it is very hard to directly measure the existence of this layer, let alone more quantitative aspects such as thickness or viscoelastic properties. In this work we probe the near surface behaviour of thin polystyrene films using a nanorheological technique. To do this, we uniformly distribute gold nanoparticles on the surface. A particle's motion on the surface is then driven by surface capillary waves. The motion of nanoparticles is detected by dynamic light scattering. Since the particles only interact with the surface region (determined independently using AFM), these experiments tell us about the viscoelastic properties of the near surface region.

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Date submitted: 30 Nov 2005

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