Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

**Plastic flow and failure in metallic glass/nanocrystal composites**[1] MICHAEL FALK, PENGFEI GUAN, Johns Hopkins University — The exploitation of metallic glasses' high strength in structural applications is limited by their lack of any hardening subsequent to yield. This lack of hardening leads to plastic localization as evidenced by the spontaneous formation of shear bands. One proposed method of forestalling such instabilities is to introduce nanocrystal inclusions to disrupt shear band nucleation and propagation. We have undertaken a series of molecular dynamics simulations of glasses with different morphologies of nanocrystallites. We report the resulting plastic response, and we use various simulations of these types to test the applicability of the shear transformation zone (STZ) constitutive relation for modeling such complex nano-composite materials.

[1]Funded by NSF under grant DMR0808704

Michael Falk
Johns Hopkins University

Date submitted: 11 Nov 2011 Electronic form version 1.4