Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Memory Dynamics in Cross-linked Actin Networks DANIELLE SCHEFF, SAYANTAN MAJUMDAR, MARGARET GARDEL, James Franck Institute, University of Chicago, dpt of Physics — Cells demonstrate the remarkable ability to adapt to mechanical stimuli through rearrangement of the actin cytoskeleton, a cross-linked network of actin filaments. In addition to its importance in cell biology, understanding this mechanical response provides strategies for creation of novel materials. A recent study has demonstrated that applied stress can encode mechanical memory in these networks through changes in network geometry, which gives rise to anisotropic shear response. Under later shear, the network is stiffer in the direction of the previously applied stress. However, the dynamics behind the encoding of this memory are unknown. To address this question, we explore the effect of varying either the rigidity of the cross-linkers or the length of actin filament on the time scales required for both memory encoding and over which it later decays. While previous experiments saw only a long-lived memory, initial results suggest another mechanism where memories relax relatively quickly. Overall, our study is crucial for understanding the process by which an external stress can impact network arrangement and thus the dynamics of memory formation.

Danielle Scheff
James Franck Institute, University of Chicago, dpt of Physics

Date submitted: 11 Nov 2016 Electronic form version 1.4