Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Nonlinear intracellular elasticity controlled by myosin-generated fluctuating stress MING-TZO WEI, H. DANIEL OU-YANG, Lehigh University, LEHIGH UNIVERSITY TEAM — The mechanics of biological cells are governed by a network of cytoskeletal filaments and molecular motors forming a dynamic mechanical entity. It has been found that local elasticity of in vitro active polymer networks, a synthesized cytoskeletal network, increase as a result of myosin-generated stresses. It is unknown this also holds in the local intracellular stress. We study the intracellular stress by the combination of the approaches of active and passive microrheology to measure the myosin-generated fluctuating stress and intracellular elasticity. Our experimental data show an increase in the fluctuations of the cellular elasticity with increasing motor-generated fluctuating local stress inside living cells. In addition, we found a direct correlation between the mean intracellular elasticity and steady-state intracellular stress. Our study provides a link between in vitro active polymer networks and in vivo cell experiments.

Ming-Tzo Wei
Lehigh University

Date submitted: 15 Nov 2013 Electronic form version 1.4