Paula Andrea Vasquez* (pvasquez@unc.edu), Chapel Hill, NC 27514, and M Gregory Forest, Jeremy Cribb and Richard Superfine. Non-linear signatures of entangled polymer solutions in active microbead rheology. Preliminary report.

We present an active microrheology protocol, based on magnetically driven microbeads, to measure and interpret nonlinear properties of entangled polymer solutions. The experimental signature is a bead take-off (acceleration) event, signaling a dynamic transition from a linear Stokes to a nonlinear response, while yielding linear and nonlinear properties. Simulations based on the Rolie-Poly model capture the behavior qualitatively, revealing the nonlinear transition as a dynamic strain-thickening event associated with chain entanglement distortions and stress accumulation at the bead surface. (Received August 29, 2011)