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The spatial response of nonlinear strain propagation in response to actively driven microspheres through entangled actin networks TOBIAS FALZONE, SAVANNA BLAIR, RAE ROBERTSON-ANDERSON, University of San Diego — The semiflexible biopolymer actin, a ubiquitous component of nearly all biological organisms, plays an important role in many mechanically-driven processes such as muscle contraction, cancer invasion and cell motility. As such, entangled actin networks, which possess unique and complex viscoelastic properties, have been the subject of much theoretical and experimental work. However, due to this viscoelastic complexity, much is still unknown regarding the correlation of the applied stress on actin networks to the induced filament strain at the molecular and micro scale. Here, we use simultaneous optical trapping and fluorescence microscopy to characterize the link between applied microscopic forces and strain propagation as a function of strain rate and concentration. Specifically, we track fiduciary markers on entangled actin filaments before, during and after actively driving embedded microspheres through the network. These measurements provide much needed insight into the molecular-level dynamics connecting stress and strain in semiflexible polymer networks.

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