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The role of single fiber strain stiffening in fibrin networks[1]
NATHAN HUDSON, UNC-CH Department of Physics and Astronomy, DANIEL MILLARD, Department of Biomedical Engineering at Georgia Tech University, JOHN HOUSER, E. TIMOTHY O'BRIEN, UNC-CH Department of Physics and Astronomy, SUSAN LORD, UNC-CH Department of Patology and Laboratory Medicine, RICHARD SUPERFINE, MICHAEL FALVO, UNC-CH Department of Physics and Astronomy — The mechanical properties of fibrin networks, the primary structural component of blood clots, are of great interest both from a biophysics and biomedical perspective. We take a novel approach to studying fibrin network mechanical properties using a combination fluorescence/atomic force microscope system to quantitatively manipulate and visualize the network. Many biological gels exhibit non-linear elasticity known as strain stiffening, but the origins of this behavior are not well understood. We hypothesized that the strain stiffening of individual fibers plays a role in the response of the overall network, and the data indicate that some of the individual fibers within a network do strain stiffen and distribute strain to less strained fiber segments. Each network pulled was also compared to a linear spring model of the same geometry. Preliminary analysis showing a difference between the strain distributions in the model and the actual network will be presented.

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