

MAR07-2006-000558

Abstract for an Invited Paper  
for the MAR07 Meeting of  
the American Physical Society

### **Elasticity of Crosslinked Biopolymer Networks**

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Crosslinked networks of biopolymers exhibit an enormous variety of nonlinear elastic behaviors depending on the rigidity of constituent polymers and the geometry and topology of the network. This talk will present a brief review of the general theory of nonlinear elasticity. It will then discuss the phenomenon of strain stiffening in networks of semiflexible polymers and present a theory [1] of this phenomena based on the nonlinear force-extension curve of these polymers and the simplifying assumption of affine response. The nonlinear stress-strain curves predicted by this theory agree remarkably well with experiments on a number of different polymer networks. Limitations and extensions of the simple theory including extensions to nonaffine behavior will also be discussed.

[1] Storm, Cornelis, Jennifer J. Pastore, Jennifer J., Fred C. MacKintosh, Fred C., T.C. Lubensky, T.C., and Paul A. Janmey, Paul A., *Nature* **435**, 191-194 (2005).