MAR07-2006-007280

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

**Floppy modes and non-affine deformations in biopolymer networks**

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Fibrous materials are ubiquitous in nature. They form the cytoskeleton of cells and are essential components of the extracellular matrix. Its building blocks are stiff protein filaments and a myriad of associated crosslinking proteins. The interplay between the elasticity of the biopolymers and the binding and elastic properties of the crosslinkers lead to a variety of network architectures [1]. We review recent advances in understanding the elastic properties of these networks in terms of "floppy modes" [2], which are the relevant low-energy excitations characterizing non-affine deformations. This approach might very well serve as a novel paradigm to understand the elasticity of microstructured materials. The theoretical concepts are applied to recent experimental studies of F-actin networks crosslinked with fascin. [1] C. Heussinger and E. Frey, Stiff Polymers, Foams and Fiber Networks, Phys. Rev. Lett. 96, 017802 (2006). [2] C. Heussinger and E. Frey, Floppy Modes and Non-Affine Deformations in Random Fiber Networks, Phys. Rev. Lett. 97, 105501 (2006)