

Abstract Submitted
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Affine deformation in polymer networks¹ ANINDITA BASU, QI WEN, PAUL JANMEY, ARJUN YODH, University of Pennsylvania, DEPT. OF PHYSICS AND ASTRONOMY, UNIVERSITY OF PENNSYLVANIA COLLABORATION, INSTITUTE FOR MEDICINE AND ENGINEERING, UNIVERSITY OF PENNSYLVANIA COLLABORATION — An affine deformation is one where a macroscopic deformation applied on a body is translated uniformly to the microscopic level. Much existing theory, ranging from simple rubber elasticity to non-linear elasticity in biological polymer networks, is based on the assumption that deformations are affine. We explore the validity of the affine assumption by embedding micron-sized fluorescent beads within model polymer networks and quantifying their displacements when the sample is put under shear deformation. We quantify the non-affine deformations as functions of polymer chain density, cross-link concentration and find our results to be in qualitative agreement with current theories of rubber elasticity.

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