

Abstract Submitted
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Nonaffinity and nonlinearity in random elastic networks BRIAN DIDONNA, University of Minnesota, TOM LUBENSKY, PAUL JAMNEY, University of Pennsylvania — We develop a general framework for the elasticity of networks with spatially varying elastic constants. We consider spring networks with randomness in either the spring constants, node position and connectivity, or internal stresses (through frustrated bond lengths). The non-affine component of the elastic response and corrections to bulk elasticity are calculated as a function of the magnitude and spatial correlations of the effective local elastic constants. Our calculations are verified through extensive numerical simulations. We believe this framework will apply to stiff polymer gels, foams, and random bead packings.

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