

Abstract Submitted
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Elastic properties of vimentin networks¹ YI-CHIA LIN, AMY C. ROWAT, Harvard University, HARALD HERRMANN, German Cancer Research Center, CHASE C. BROEDERSZ, FREDERICK C. MACKINTOSH, Vrije Universiteit, ELEANOR A. MILLMAN, DAVID A. WEITZ, Harvard University — We measure the mechanical properties of in vitro networks of the intermediate filament protein vimentin by rheometry. Vimentin networks are highly elastic even for small volume fractions of protein and exhibit dramatic stiffening with strain. We find that divalent ions such as Ca²⁺ and Mg²⁺ act as effective cross-linkers in the vimentin network. The observed linear and nonlinear elastic responses at intermediate strains can be explained quantitatively by affinely stretching the entropic fluctuations of single semiflexible filaments; at high strains, enthalpic stretching of the individual filaments contributes to the observed nonlinear response.

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Eleanor A. Millman
Harvard University

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