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Viscoelastic dynamics in a system of two actin filaments under stress ARJAN ERIK BOERMA, ERIK VAN DER GIESSEN, Univ of Groningen, STEFANOS PAPANIKOLAOU, Johns Hopkins University — The viscoelasticity of cytoskeleton networks is experimentally well-established but still lacks a consistent theoretical description. We present a novel minimal model that consists of two semi-flexible filaments coupled by cross-linkers, whose dynamics are described by Grand Canonical Monte Carlo. The mechanical properties are captured in the continuum and solved through an athermal finite-element approach. We discuss the phase diagram of the model and the emergence of viscoelastic behavior: the variation of the dynamic modulus as a function of loading frequency and density of cross-linkers, in thermodynamically and biologically realistic settings.

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