Abstract Submitted
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Elasticity of a Chiral elastomer APARNA BASKARAN, XIANGJUN XING, Syracuse University — We study the nonlinear elasticity of an elastomer made by crosslinking a chiral polymer melt in its isotropic state. It is shown that such an elastomer is unstable to uniaxial extension/compression and tends to develop a twist along the axis of deformation. Both phonon correlation functions and polarization dependent sound velocity are calculated. Furthermore, when such an elastomer is cooled below the isotropic-nematic transition of the underlying polymer melt, it develops inhomogeneous spontaneous deformations to accommodate the emergent chiral ordering of the polymers. We perform variational analysis of these spontaneous deformation in different regimes of system parameters.

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