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Mechanics of Anisotropic Semiflexible Gels ANDREW MISSEL, Department of Chemistry and Biochemistry, UCLA, MO BAI, WILLIAM KLUG, Department of Mechanical and Aerospace Engineering, UCLA, ALEX LEVINE, Department of Chemistry and Biochemistry, UCLA — We present the results of analytic and numerical investigations into the mechanics of anisotropic semiflexible gels. Previous work has uncovered the existence of an affine/non-affine crossover as a function of the density of cross-links in the semiflexible filament network. The affine regime is characterized by a spatially homogeneous strain field and filament stretching under applied shear strain, while the non-affine regime is characterized by a spatially heterogeneous strain field and filament bending. Previous studies focused on statistically isotropic networks. Here we explore the effect of network anisotropy on the affine/non-affine crossover. We examine elastic energy storage and the geometry of the displacement field in networks having a non-vanishing nematic order parameter under both shearing and stretching deformations. Understanding the impact of filament anisotropy on the affine/non-affine crossover may inform the biophysical study of cellular mechanics where the filamentous networks have locally preferred directions.

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