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Wrinkling in thin nematic elastomers MADISON KRIEGER, Brown University, MARCELO DIAS, Aalto University, THOMAS POWERS, Brown University — Coupling a nematic liquid crystal to a rubbery matrix can create a variety of surprising elastic effects. We derive a Föppl-von Kármán type model for a very thin nematic elastomer, based on a phenomenological free energy. The model couples the order parameter to the elastic degrees of freedom of the plate. There are two categories of cross-linking which we explore: cross-linking in the isotropic phase, and cross-linking in the nematic phase. We consider the problem of wrinkling in scenarios of annular and rectangular sheets with tensile boundary conditions, where confinement causes a classical elastomer to buckle out-of-plane into a wrinkled configuration.

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