

Abstract Submitted
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Shape transformations in liquid crystal elastomers with complex microstructure¹ VIANNEY GIMENEZ-PINTO, JONATHAN SELINGER, ROBIN SELINGER, Kent State University — Recent experimental and theoretical studies have reported thermal-induced shape transformations in nematic liquid crystal elastomer (LCE) sheets with a complex director field. Director twist across the film thickness induces formation of twisted or curled structures whose chiral sense switches with temperature [1]. Using finite element simulations, we explore more complex director geometries that produce a variety of different actuation behaviors. We explore films containing a +1 topological defect with radial or azimuthal director alignment; and stripes and checkerboard patterns of twisted domains. We compare our results with recent experimental studies by D. Broer and coworkers and theoretical work by Modes and Warner. These results demonstrate the potential for application of LCE materials as mechanical actuators. [1] Y. Sawa, F. Ye, K. Urayama, T. Takigawa, V. Gimenez-Pinto, R. L. B. Selinger, and J. V. Selinger, PNAS 108, 6364 (2011).

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