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Simulation studies of liquid crystal elastomers: response to light[1]
ROBIN SELINGER, JONATHAN V. SELINGER, BADEL L. MBANGA, Kent State University — Azo-dye doped nematic elastomers bend and flex when subject to photoexcitation. We model this mechanical response at the continuum level using nonlinear finite element simulation. Our finite element algorithm uses explicit dynamics based on a Hamiltonian which couples mechanical strain and nematic order. Our explicit dynamics algorithm is structured essentially like molecular dynamics, and we discuss how this continuum level code can be easily integrated into a multiscale model. We use the model further to explore potential applications of nematic elastomers in microfluidics, fiber orientation control, and biologically-inspired robots.

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