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Optical patterning and dynamics of torons and hopfions in a chiral nematic with photo-tunable equilibrium pitch HAYLEY SOHN, PAUL ACKERMAN, IVAN SMALYUKH, Univ of Colorado - Boulder — Three-dimensional (3D) topological solitons arise in field theories ranging from particle physics to condensed matter and cosmology. They are the 3D counterparts of 2D skyrmions (often called "baby skyrmions"), which attract a great deal of interest in studies of chiral ferromagnets and enable the emerging field of skyrmionics. In chiral nematic liquid crystals, the stability of such solitons is enhanced by the chiral medium's tendency to twist the director field describing the 3D spatial patterns of molecular alignment. However, their experimental realization, control and detailed studies remain limited. We combine experimental realization and numerical modeling of such light-responsive solitonic structures, including elementary torons and hopfions, in confined chiral nematic liquid crystals with photo-tunable cholesteric pitch. We show that the optical tunability of the pitch allows for using low-intensity light to control the soliton stability, dimensions, spatial patterning and dynamics.

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