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Spontaneous emergence of twist and formation of monodomain in lyotropic chromonic liquid crystals confined to capillaries. JINXIN FU, KARTHIK NAYANI, JUNG OK PARK, MOHAN SRINIVASARAO, Georgia Institute of Technology — Unlike conventional nematics, lyotropic chromonic liquid crystals are notoriously hard to align. We report on the homogeneous planar alignment of Sunset Yellow in a flat rectangular capillary. Remarkably, the in-plane director aligns perpendicular to the long axis of the rectangular capillary resulting in a counterintuitive configuration. We rationalize the evolution of this configuration from a metastable doubly-twisted configuration by considering the coupling of the curvature of the edges of the rectangle to the Frank free energy via the saddle-splay contribution. In contrast, for a square capillary, the doubly-twisted configuration is the final ground state. Using a simple scaling argument, we show that the aspect ratio of the confining geometry determines the ground state.

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