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**Spontaneous growth morphology transitions of interfacial instabilities in nematic liquid crystals** QING ZHANG, Massachusetts Institute of Technology, SHUANG ZHOU , UMass Amherst, IRMGARD BISCHOFBERGER, Massachusetts Institute of Technology — The displacement of a more viscous fluid by a less viscous one in the gap between two parallel plates leads to the formation of complex fingering patterns. In isotropic systems, dense-branching morphologies arise from repeated tip-splitting of the evolving finger. In anisotropic systems, by contrast, the growth morphology changes to dendritic growth characterized by stable needle-like structures. We investigate the morphology transitions between dendritic growth and dense-branching growth in an intrinsically anisotropic liquid, a lyotropic chromonic liquid crystal in the nematic phase. We find that the pattern morphology spontaneously changes from dense-branching growth to dendritic growth upon an increase of the fingertip velocity or a decrease of the gap size. We demonstrate that these morphology transitions are related to a change in the configuration of the liquid crystal alignment that is governed by the competition of viscous and elastic torques, and which leads to anisotropy in the effective viscosities vertical and parallel to the propagation direction of the fingers.

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