

Stable and metastable patterns in chromonic nematic liquid crystal droplets forced with static and dynamic magnetic fields

Jordi Ignés-Mullol, Marc Mora, Berta Martínez-Prat, Ignasi Véllez-Cerón, R. Santiago Herrera, Francesc Sagués

Supplementary Material

Supplementary Figures

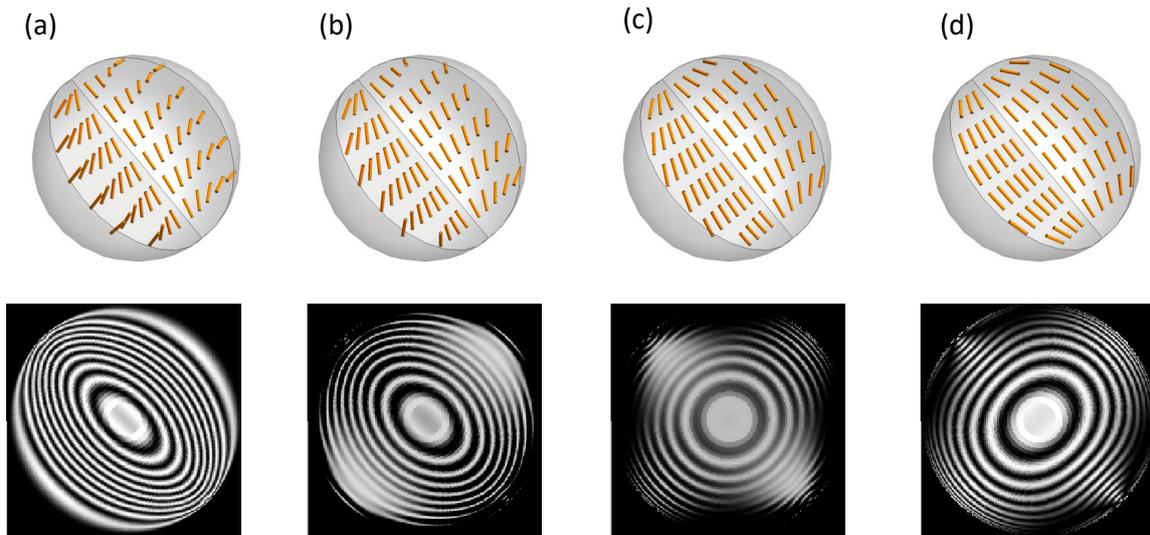


Fig. S1. Simulated polarizing microscopy textures for bipolar droplets with different amounts of twist, as indicated by the director field diagram above each image. The twist angle at the outer boundary is $\alpha = 90^\circ$ (a), $\alpha = 60^\circ$ (b), $\alpha = 30^\circ$ (c), and $\alpha = 0^\circ$ (d).

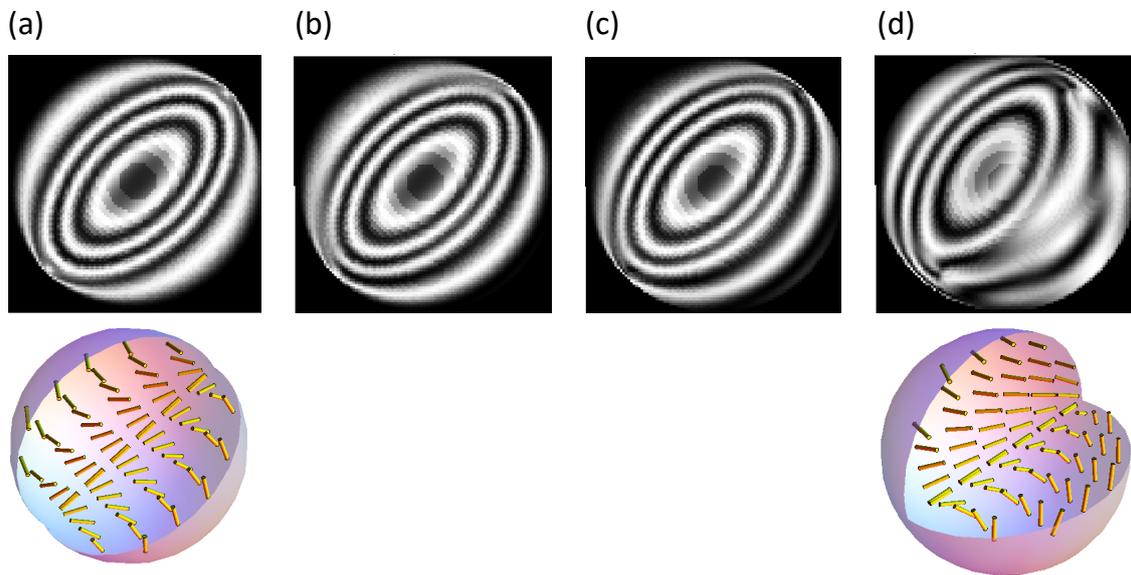


Fig. S2. Simulated polarizing microscopy textures for twisted bipolar droplets whose symmetry axis is misaligned with the plane of observation. (a) Perfectly aligned droplet. The director field is sketched underneath. Droplet axis has 9 degrees of misalignment (b), 18 degrees of misalignment (c), and 45 degrees of misalignment (d). The director field is sketched underneath (a) and (d).

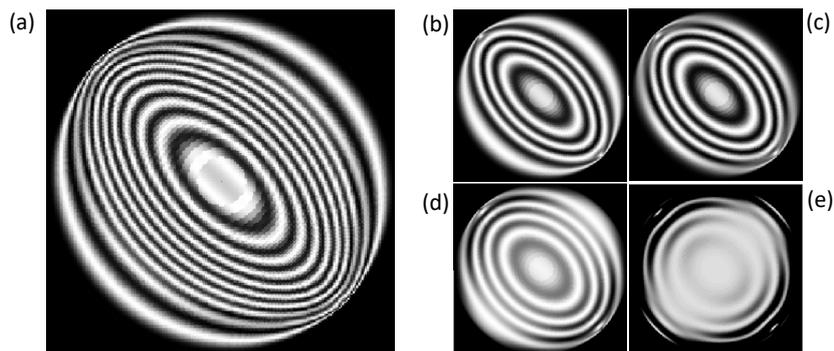


Fig. S3. Simulated polarizing microscopy textures for twisted bipolar droplets of different sizes and configurations. (a) Droplet with diameter $44 \mu\text{m}$ and twist angle at the outer boundary 100° . (b) Droplet with diameter $22 \mu\text{m}$ and twist angle at the outer boundary $\alpha = 100^\circ$. (c) Droplet with diameter $22 \mu\text{m}$ and twist angle at the outer boundary $\alpha = 83^\circ$. (d) Droplet with diameter $22 \mu\text{m}$ and twist angle at the outer boundary $\alpha = 67^\circ$. (e) Droplet with diameter $22 \mu\text{m}$ and twist angle at the outer boundary $\alpha = 50^\circ$.

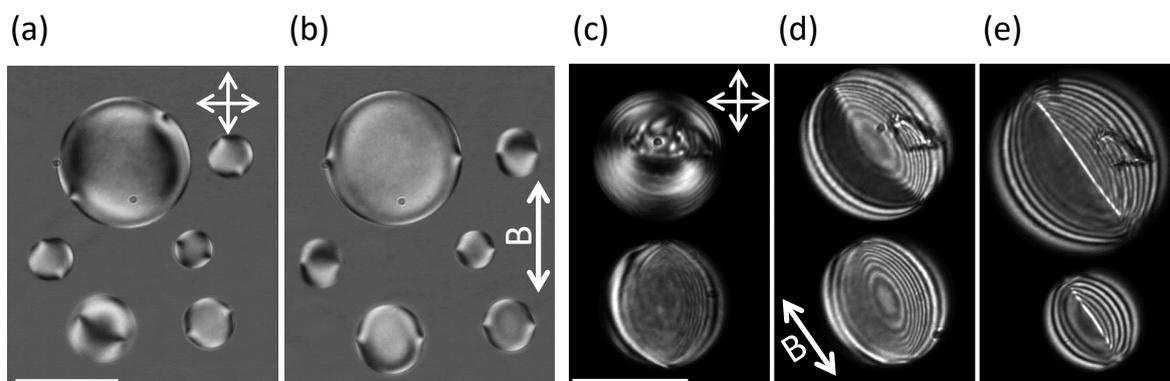


Fig. S4. Alignment of nematic gems in the presence of a magnetic field for nematogens with negative diamagnetic anisotropy. (a) The liquid crystal CCN-37, which features nematic gems with the usual bipolar configuration are aligned with their symmetry axis in the plane of the sample and perpendicular to a 0.4 T magnetic field, without significant changes in the internal texture (b). (c) In the case of SSY, which features a twisted bipolar configuration, the symmetry axis becomes aligned parallel to the 0.1 T magnetic field (d), and the director field changes its configuration, which is clearly observable at a field of 0.4 T (e).

Supplementary Videos

Movie 1. A video showing the effect of gradually increasing an external magnetic field applied on an SSY nematic gem from 50 to 434 mT, observed under crossed polarizers.

Movie 2. A video showing the effect of gradually increasing an external magnetic field applied on an SSY nematic gem from 50 to 434 mT, observed without polarizers.

Movie 3. A representative video showing an SSY nematic gem transitioning from the concentric to the bipolar configuration when an external magnetic field of 400 mT rotating at 5 deg s^{-1} counter-clockwise is applied.

Movie 4. A video displaying the effect of a rotating magnetic field rotating at 10 deg s^{-1} on small emulsified SSY droplets, which rotate synchronously.

Movie 5. A video displaying the effect of a rotating magnetic field at 7 deg s^{-1} on larger emulsified SSY droplets, which rotate asynchronously.