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Topological Defects in Liquid Crystals: Studying the Correlation between Defects and Curvature CHARLES MELTON, University of California Merced — Topological defects have recently been the subject of many fascinating studies in soft condensed matter physics. In particular, linking the evolution of topological defects to curvature changes has been a focus, leading possible applications in the areas such as cosmetics, pharmaceuticals, and electronics. In this study, defects in nematic liquid crystal droplets are investigated via laboratory and theoretical techniques. Nematic liquid crystal defects are reproduced via Monte Carlo simulations using a modified 2D XY-Model Hamiltonian. The simulation is performed on a curved surface to replicate a nematic droplet and examine possible defect configurations. To complement this theoretical work, we have trapped nematic droplets inside a dual-beam optical trap. This system allows controllable non-contact droplet deformation on a microscope based platform. Future work will focus on using the trap to stretch nematic droplets, correlating the changing topological defects with theoretical predictions.

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