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Toplogical defects in cholesteric liquid crystal shells ALEXANDRE DARMON, EC2M - UMR CNRS 7083 Gulliver - ESPCI ParisTech, MICHAEL BENZAQUEN, PCT - UMR CNRS 7083 Gulliver - ESPCI ParisTech, OLIVIER DAUCHOT, TERESA LOPEZ-LEON, EC2M - UMR CNRS 7083 Gulliver - ESPCI ParisTech — Confining rod-like molecules, such as the nematogens of liquid crystals, on a curved surface inevitably yields topological defects. Remarkably, in the specific case of a nematic sphere, Poincaré stated that the sum of the topological charges of the defects is equal to +2. Recent studies have shown that, in the case of nematic shells, three kinds of configuration are possible. Each of these configurations correspond to different arrangements of defects that satisfy Poincaré's theorem. But much richer scenarii appear when playing with the shell thickness, since bulk effects start competing with surface effects. In particular, we show that inducing chirality in the liquid crystal can have a dramatic effect in the defect structure of the shell, where the ratio c between the cholesteric pitch and the shell thickness becomes the control parameter. We also study into details the equilibrium configuration obtained for $c >> 1$, which corresponds to the structure with a single disclination line of charge +2, also know as the Frank-Pryce structure. Following the idea brought by the simulations of Sec et al. on cholesteric droplets, we show experimentally that this structure is not a pure +2 line but is actually found to be two non-singular +1 lines that are winded around each other.

Alexandre Darmon
EC2M - UMR CNRS 7083 Gulliver - ESPCI ParisTech

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