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Structures in liquid crystalline shells at a nematic-smectic transition[1] JAN LAGERWALL, Seoul National University, Grad. School of Convergence Science & Technology, Korea, HSIN-LING LIANG, Inst. of Organic Chemistry, Johannes Gutenberg University Mainz, Mainz, Germany, PER RUDQUIST, Chalmers University of Technology, Dept. for Microtechnology & Nanoscience, Goteborg, Sweden — Liquid crystalline shells display phenomena that are fascinating from a fundamental physics point of view and they also hold promise for innovative applications e.g. for advanced colloids. The key feature of these shells is the unavoidable presence of topological defects, the types and numbers of which depend on the phase as well as the geometrical features of the shell. Here we present our investigation of the complex internal reordering phenomena occurring in a liquid crystalline shell undergoing a transition between the nematic and smectic phases. In the smectic phase, the topological and geometrical constraints of a spherical shell with symmetric boundary conditions imposed on the developing 1D quasi-long-range order create a conflict that triggers a series of buckling instabilities, resulting in two different characteristic defect patterns. We will also show very recent results on shells with asymmetric boundary conditions, giving rise to beautiful complex patterns, some transitory, some stable. The phase transition between nematic and smectic order yields varying textures depending on the shell size and thickness, and on the specific alignment types at the shell in- and outside, respectively.

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