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Modeling smectic layers in confined geometries: Order parameter and defects

Abstract

We identify problems with the standard complex order parameter formalism for smectic-A (SmA) liquid crystals and discuss possible alternative descriptions of smectic order. In particular, we study in detail an approach based on the real smectic density variation rather than a complex order parameter. This approach gives reasonable numerical results for the smectic layer configuration and director field in sample geometries and can be used to model smectic liquid crystals under nanoscale confinement for technology applications.