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Free Energy Functional for Bend-core Liquid-Crystal Molecules
RUI ZHANG, AN-CHANG SHI, McMaster University — Bend-core liquid-crystal molecules, such as polymers containing banana-shaped mesogens, exhibit very rich phase behaviour. Theoretical studies of this fascinating system include Landau theory and simulations. Starting from a molecular model and using a self-consistent field theory approach, we develop a field-theoretical description of the thermodynamics for bend- core liquid-crystal systems. We incorporate the order parameters, which characterize the particular geometry and potential structures of bent-core molecules, into the free energy functional. The resulting free energy functional is used to study phases and phase transitions of the system, including a group of important phases under diverse physical conditions. The results will be compared with several recent experiments.

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