Description of Phase Transitions in chiral ferroelectric Liquid Crystals

Shri Singh
Department of Physics, Banaras Hindu University
Varanasi-221 005
Email: srisingh23@gmail.com, srisingh@rediffmail.com

Abstract

The study of chiral ferroelectric liquid crystals has seen substantial experimental strides. In theoretical aspects, there has been relatively little basic work on this fascinating class of material.

We constructed a free-energy density expansion for the description of phase transition properties of chiral ferroelectric liquid crystals. In this expansion the free-energy density is expanded in terms of three degrees of freedom- tensor orientaional order $Q_{ij,}$ scalar smectic order ψ and polarization vector P and their coupling terms. Based on the plea that Q_{ij} governs ξ, no term in this expansion involves ξ alone but the order parameters coupling terms involve ξ. The application of the model will be considered to describe the phase transition properties of ferroelectric, surface stabilized ferroelectric and bent-core liquid crystals. The influence of temperature, pressure and electric field on these properties will be discussed.