

Abstract Submitted
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Field-induced phase transitions in SmCP phases of bent-core liquid crystals S. DHAKAL, JONATHAN V. SELINGER, Liquid Crystal Institute, Kent State University — Liquid crystals composed of bent-core molecules have been studied extensively because they exhibit a wide variety of phases with potential applications. The smectic phases of these molecules have polar order in the layer plane due to the close packing. If the molecules are tilted with respect to the layer normal, the combination of tilt and polar order gives the layer chirality. The resulting liquid crystal can be either chiral or racemic (antichiral), even if the molecules are achiral. The reversibility of these two states with the application of electric field implies the possibility of making light shutters from antiferroelectric liquid crystals of bent-core molecules [1]. Extending an earlier model of chiral order [2], we develop a phenomenological theory involving three order parameters: chirality (χ), polarity (P) and tilt (θ) within each layer. By minimizing the free energy, we predict multiple phase transitions ($\text{SmC}_A\text{P}_A \rightarrow \text{SmC}_S\text{P}_F$, $\text{SmC}_A\text{P}_A \rightarrow \text{SmC}_A\text{P}_F$) as a function of electric field, consistent with experiments. [1] A. Jakli *et al.*, *Liq. Cryst.* **29**, 377 (2002). [2] J.V.Selinger, *Phys. Rev. Lett.* **90**, 165501(2003).

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