Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Macroscopic torsional strain and induced molecular conformational deracemization RAJRATAN BASU, JOEL PENDERY, ROLFE PETSCHEK, Case Western Reserve University, ROBERT LEMIEUX, Queen's University, CHARLES ROSENBLATT, Case Western Reserve University — A macroscopic helical twist is imposed on an achiral nematic liquid crystal by controlling the azimuthal alignment directions at the two substrates. On application of an electric field the director rotates in the substrate plane. This electroclinic effect, which requires the presence of chirality, is strongest at the two substrates and increases with increasing imposed twist distortion. We present a simple model involving a tradeoff among bulk elastic energy, surface anchoring energy, and deracemization entropy that suggests the large equilibrium director rotation at the surfaces induces a deracemization of chiral conformations in the molecules, quantitatively consistent with experiment.

Rajratan Basu
Case Western Reserve University

Date submitted: 05 Dec 2011 Electronic form version 1.4