## Abstract Submitted for the MAR08 Meeting of The American Physical Society

Evidence of Broken Reciprocity in Chiral Liquid Crystals MICHELE MOREIRA, NITHYA VENKATARAMAN, BAHMAN TAHERI, PE-TER PALFFY-MUHORAY, Liquid Crystal Institute, KSU — Reciprocity in light scattering is predicated on bounded scattering media with symmetric and linear permittivity, conductivity and permeability. Due to their anisotropy and chirality, cholesteric liquid crystal form periodic dielectric structures. If the periodicity is comparable to the wavelength of light, these phases are self-assembled photonic band gap structures. There appear in the permittivity odd powers of the wave vector resulting from nonlocality and broken inversion symmetry. Evidence of non-reciprocity has been found in optically active crystals by Bennett [1] and in stacks of cholesteric and nematic liquid crystal cells by Takezoe [2]. We present experimental data showing broken reciprocity in transmittance and reflectance in cholesteric cells with different pitches having overlapping but distinct reflection bands. We explain our results in terms of simple analytic descriptions of material properties and propagating modes. [1] P.J. Bennett, S. Dhanjal, Yu. P. Svirko and N. I. Zheludev, Opt. Lett. 21, 1955 (1996)

[2] J. Hwang; M.H. Song; B. Park; S. Nishimura; T. Toyooka; J.W. Wu; Y. Takanishi;
K. Ishikawa; H. Takezoe, *Nat. Mat.* 4, 383 (2005).

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