

Abstract Submitted
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**Apparent Broken Reciprocity in Chiral
Liquid Crystals¹** MICHELE MOREIRA, NITHYA VENKATARAMAN, PETER

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— Reciprocity in optics is predicated on bounded scattering media with symmetric and linear permittivity, conductivity and permeability. Due to their anisotropy and chirality, cholesteric liquid crystals (CLCs) 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 investigate experimentally and theoretically the possibility of a violation of optical reciprocity of a hetero-photonic-bandgap structure made of two CLC cells of different pitch. We have observed a significant apparent violation, but we show that the effect is due to light scattering, and in fact these cholesteric structures are reciprocal.

[1] P.J. Bennett et al. *Opt. Lett.* 21, 1955 (1996)

[2] J. Hwang; et al. *Nat. Mat.* 4, 383 (2005).

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