Abstract Submitted
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Photon localization in a nematic liquid crystal[1] JIM MCCLYMER, MATT LUDDEN, University of Maine, Dept. of Physics and Astronomy, JESSE WERTHEIM, None — The nematic liquid crystal MBBA, due to director fluctuations, is a highly scattering material with low absorption. We previously[2] reported that the transmission coefficient for laser light at 633 nm decays exponentially with a decay length of approximately 0.8 mm while the absorption length is over 30 times larger which we interpret as evidence for photon localization. The data does not fit a model of diffusion or diffusion with absorption. We have extended this work by measuring the decay coefficient for incoherent light from 475 to 825 nm. We find that the absorption remains low over this range, with absorption lengths ranging from 8 mm at the blue end of the spectrum to 12 mm in the near IR. The transmission coefficient in the nematic phase shows an exponential decrease with decay constants an order of magnitude smaller than the absorption length, 0.4 mm, in the blue end while increasing to 3 mm in the near IR. The data indicates that photon localization is observed throughout the visible region into the near IR.

[1]Maine Space Grant Consortium Grants No. EP-02-09 and No. EP-03-10

[2]J. P. McClymer and H.M. Shehadeh, Photon Localization in a Nematic Liquid Crystal, Phys. Rev. A 79, 031802(R) (2009)

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