

Abstract Submitted  
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**Exploring circular polarization in the CMB due to conventional sources of cosmic birefringence**<sup>1</sup> PAULO MONTERO-CAMACHO, CHRISTOPHER HIRATA, Ohio State Univ - Columbus — The circular polarization of the cosmic microwave background (CMB) is usually taken to be zero since it is not generated by Thomson scattering. Here we explore the actual level of circular polarization in the CMB generated by conventional cosmological sources of birefringence. We consider two classes of mechanisms for birefringence. One is alignment of the matter to produce an anisotropic susceptibility tensor: the hydrogen spins can be aligned either by density perturbations or CMB anisotropies themselves. The other is anisotropy of the radiation field coupled to the non-linear response of the medium to electromagnetic fields: this can occur either via photon-photon scattering (non-linear response of the vacuum); atomic hyperpolarizability (non-linear response of neutral atoms); and plasma delay (non-linear response of free electrons). The strongest effect comes from photon-photon scattering from recombination at a level of  $\sim 10^{-13}$  K. Our results are consistent with a negligible circular polarization of the CMB in comparison with the linear polarization or the sensitivity of current and near-term experiments.

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