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Calculation of the magneto-optical response of Kane fermions in HgCdTe JOHN MALCOLM, ELISABETH NICOL, University of Guelph — The concentration $x = x_c \approx 0.17$ in $Hg_xCd_{1-x}Te$ describes a critical value in the phase transition between semimetal ($x < x_c$) and semiconductor ($x > x_c$). At this critical value, the low-energy quasiparticle dispersion exhibits a node at the intersection of two doubly degenerate linear cones and an equally degenerate flat band; quasiparticles that have been dubbed Kane fermions [1]. We present our results for the calculation of the magneto-optical spectra of these Kane fermions in the three-dimensional material, which can be compared to experiment, and also for those confined to only two-dimensions. The latter allows for a direct comparison to the analogous theoretical Dirac-Weyl system in two dimensions with pseudospin one [2].

[1] M. Orlita *et al. Nature Phys.* **10**, 233 (2014).
[2] J.D. Malcolm and E.J. Nicol. *Phys. Rev. B* **90**, 035405 (2014).

John Malcolm
University of Guelph

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