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(I) Magneto-optical Kerr effect and signature of the chiral anomaly in a Weyl semimetal in magnetic field

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One striking property of the Landau level spectrum of a Weyl semimetal (WSM) is the existence of a chiral Landau level in which the electrons propagate unidirectionnaly along the magnetic field. This linearly dispersive level profoundly influences the optical properties of the WSM especially if it originates from a tilted Weyl cone. In this talk, we compare the behavior of the magneto-optical Kerr effect (MOKE) in a WSM with that of a normal (i.e. non-topological) metal. We obtain the Kerr angle from the optical conductivity tensor σ_{αβ}(ω) using the minimal model of a WSM developed in Ref. [1] which has four tilted Weyl nodes related by mirror and time-reversal symmetry. In the Voigt configuration, a large peak of the Kerr angle occurs at the plasmon frequency. We show that the blueshift in frequency of this peak with increasing magnetic field is a signature of the chiral anomaly in the MOKE.

[1] S. Bertrand, Jean-Michel Parent, R. Côté, and I. Garate, Phys. Rev. B 100, 075107 (2019).

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