

Abstract Submitted  
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**Chiral magnetic effect and natural optical activity in (Weyl) metals**<sup>1</sup> DMYTRO PESIN, JING MA, Univ of Utah — We consider the phenomenon of natural optical activity, and related chiral magnetic effect in metals with low carrier concentration. To reveal the correspondence between the two phenomena, we compute the optical conductivity of a noncentrosymmetric metal to linear order in the wave vector of the light wave, specializing to the low-frequency regime. We show that it is the orbital magnetic moment of quasiparticles that is responsible for the natural optical activity, and thus the chiral magnetic effect. While for purely static magnetic fields the chiral magnetic effect is known to have a topological origin and to be related to the presence of Berry curvature monopoles (Weyl points) in the band structure, we show that the existence of Berry monopoles is not required for the dynamic chiral magnetic effect to appear; the latter is thus not unique to Weyl metals. The magnitude of the dynamic chiral magnetic effect in a material is related to the trace of its gyrotropic tensor. We discuss the conditions under which this trace is non-zero; in noncentrosymmetric Weyl metals it is found to be proportional to the energy-space dipole moment of Berry curvature monopoles. The calculations are done within both the semiclassical kinetic equation, and Kubo linear response formalisms.

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