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Charge transport in Weyl semimetals PAVAN HOSUR, SIDDHARTH PARAMESWARAN, U C Berkeley, USA, ASHVIN VISHWANATH, U C Berkeley, USA; Lawrence Berkeley National Lab, USA — Weyl semimetals are three-dimensional phases with band touchings, whose low-energy excitations are governed by the Weyl equation. They can be thought of as higher dimensional cousins of graphene. Recent theoretical work predicted certain pyrochlore iridates such as Y2Ir2O7 to be in this phase. We study charge transport in Weyl semimetals in the presence of Coulomb interactions or disorder at temperature T and compare our results to existing data on Y2Ir2O7 and Eu2Ir2O7. In the interacting clean limit, we determine the conductivity by solving a quantum Boltzmann equation within a "leading log" approximation and find it to be proportional to T, upto logarithmic factors arising from the flow of couplings. In the noninteracting disordered case, we compute the finite-frequency Kubo conductivity and show that it exhibits distinct behaviors for low and high frequencies compared to T. The behavior of Weyl semimetals in a magnetic field will also be briefly discussed.

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