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Berry Curvature and Chiral Plasmons in Massive Dirac Materials JUSTIN SONG, Caltech, MARK RUDNER, University of Copenhagen — In the semiclassical model of carrier dynamics, quasiparticles are described as nearly free electrons with modified characteristics modified characteristics such as effective masses which may differ significantly from those of an electron in vacuum. In addition to being influenced by external electric and magnetic fields, the trajectories of electrons in topological materials are also affected by the presence of an interesting quantum mechanical field - the Berry curvature - which is responsible for a number of anomalous transport phenomena recently observed in Dirac materials including G/hBN, and MoS2. Here we discuss how Berry curvature can affect the collective behavior of electrons in these systems. In particular, we show that the collective electronic excitations in metallic massive Dirac materials can feature a chirality even in the absence of an applied magnetic field. The chirality of these plasmons arises from the Berry curvature of the massive Dirac bands. The corresponding dispersion is split between left- and right-handed modes. We also discuss experimental manifestations.

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