Abstract Submitted
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Optical properties of the perfectly compensated semimetal WTe_2[1] C. C. HOMES, Condensed Matter Physics and Materials Science Dept., Brookhaven National Laboratory, Upton, New York, M. N. ALI, R. J. CAVA, Department of Chemistry, Princeton University, Princeton, New Jersey — The optical properties of layered tungsten ditelluride have been measured over a wide temperature and frequency range for light polarized in the a-b planes. A striking low-frequency plasma edge develops in the reflectance at low temperature where this material is a perfectly compensated semimetal. The optical conductivity is described using a two-Drude model which treats the electron and hole pockets as separate electronic subsystems. At low temperature, one scattering rate collapses by over two orders of magnitude, while the other also undergoes a significant, but less dramatic, decrease; both scattering rates appear to display the quadratic temperature dependence expected for a Fermi liquid. First principles electronic structure calculations reveal that the low-lying optical excitations are due to direct transitions between the bands associated with the electron and hole pockets.[2]

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[2]C. C. Homes, M. N. Ali, and R. J. Cava, Phys. Rev. B **92**, 161109(R) (2015).

Christopher Homes
Brookhaven Natl Lab

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