Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Optical spectroscopy of RE-Cd (RE = Gd, Y) quasicrystals and approximants N.M.R. ARMSTRONG, KIM MORTIMER, M. RAHIMI MOVASSAGH, T. TIMUSK, McMaster University, T. KONG, S.L. BUD'KO, P.C. CANFIELD, Ames Laboratory and Dept. of Physics and Astronomy, Iowa State University — To date, the optical conductivity of icosahedral quasicrystals, and their approximants, either have lacked an intraband Drude peak altogether or have shown an optical conductivity that, at best, can be described as an unresolved Drude peak with significant broadening, due to intense scattering, which is difficult to separate from interband transitions. We have measured the optical conductivity of the new family of RE-Cd (RE =Gd, Y) icosahedral quasicrystals and their approximant and found that the approximants show a well-defined peak at low frequency that cannot be fit with standard Drude theory. We will discuss our findings in terms of Mayou's generalized Drude theory of anomalously diffusing electrons.

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Date submitted: 01 Jun 2021 Electronic form version 1.4