Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Optical Spectroscopy of anomalous Fermi Liquids. THOMAS TIMUSK, McMaster Univ — It is customary to classify a metallic conductor as a Fermi liquid if, at low temperatures, the electrical resistivity varies as the square of the absolute temperature. Fermi liquid theory shows that if umklapp scattering dominates then, independent of a particular band structure, this T squared dependence is accompanied by a quadratic frequency dependence where $\rho(\mathrm{T},\omega) = C(\omega^2 + b(\pi \mathrm{T})^2)$ where the scaling constant b =4 for a Fermi liquid[1,2]. A survey of literature shows that where spectroscopic data exist, b =4 has not been generally observed[3]. We find that, surveying the recent literature, that in heavy fermion systems the scaling coefficient b =1, pointing to a resonant scattering mechanism [2]. In most other systems an unknown mechanism yields a value of b of around 2. 1. R. N. Gurzhi, Sov. Phys. JETP **14**, 886 (1962). 2. D.L. Maslov and A.V. Chubukov, Phys. Rev. B **86**, 155137 (2012). 3. U. Nagel *et al.* PNAS **109**, 19161 (2012).

Thomas Timusk
McMaster Univ

Date submitted: 03 Nov 2015 Electronic form version 1.4