Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Thermoelectric Measurements of Electronic Diffusivity in Bad Metals[1] JIECHENG ZHANG, ELI LEVENSON-FALK, AHARON KAPITULNIK, Stanford University — Many interesting materials, including cuprate superconductors and heavy-fermion systems, exhibit "bad metal" behavior at high temperatures, where the electronic mean free path is shorter than the de Broglie wavelength. Recent theory [1] postulates that conduction in such systems is best described by collective incoherent transport, instead the standard quasiparticle model. This has implications for the temperature dependence of electronic diffusivity in these systems. We present a setup for measuring electronic diffusivity: a laser beam is focused onto a material surface and chopped, creating a periodic, concentrated heat source. The resulting thermoelectric signal is measured at various positions on the same surface with sharp voltage probes. By sweeping temperature in the range 10-450 K, we are able to measure the temperature dependence and anisotropy of the electronic diffusivity of the material. We discuss experimental improvements and measurements of cuprate superconductors.

[1] arXiv:1405.3651

[1]This work was funded by the Department of Energy.

Jiecheng Zhang
Stanford University

Date submitted: 13 Nov 2014 Electronic form version 1.4