Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Strong correlation effects in the IR Hall Effect in the cuprates: an overview[1] H.D. DREW, University of Maryland — The Hall Effect at infrared frequencies provides a sensitive probe of strong interaction effects in strongly correlated metals. Experimental results show that the strong interaction effects inter the Hall conductivity and the optical conductivity differently in the cuprates [1,2,3]. For hole doping the Hall angle at mid IR frequencies is nearly simple Drude but with a scattering rate that is nearly frequency dependent in contrast to the optical conductivity [1]. The Hall frequency is in good agreement with ARPES results at optimal doping but increases rapidly for underdoped samples in contrast to expectations from ARPES [1,2]. The electron doped cuprates show evidence for density wave gap excitations and are non Drude-like even outside the density wave regime of doping and temperature [3]. A recent theoretical analysis based on the exchange of magnetic excitations that includes vertex corrections in the conductivity appears to account for many of these observations [4].
[1] DC Schmadel, et al., cond-mat/0510793.
[2] L Shi, et al., cond-mat/0510794.
[3] A Zimmers, et al., cond-mat/0510085.
[4] H Kontani, cond-mat/0507664.

[1]NSF supported

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Date submitted: 28 Nov 2005 Electronic form version 1.4