Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Theory of Infrared Hall Conductivity of Electron-doped Cuprates[1] JIE LIN, ANDREW MILLIS, Department of Physics, Columbia University — It has been proposed by several experiments that the electron-doped cuprate $Pr_{2-x}Ce_xCuO_{4+\delta}$ undergoes a quantum phase transition to an antiferromegnetic state for the doping x smaller than 0.16. Here, we investigate the infrared Hall conductance of the electron-doped cuprates in the commensurate spin density wave state, using the linear response theory. The qualitative agreement between our results and the available experimental data provides strong evidence in favor of the spin density wave scenario and suggests that the magnitude of the gap is large, while quantitative discrepancies point towards additional physics which may be related to scattering of carriers off spin fluctuations. We also discuss the Hall conductivity sum rule and its connection to the experiments.

[1]Research supported by NSF DMR 0431350.

Jie Lin
Department of Physics, Columbia University

Date submitted: 20 Nov 2006 Electronic form version 1.4