Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

**Infrared Hall effect in underdoped and optimally doped La$_{2-x}$Sr$_x$CuO$_4$**

LINGYUN SHI, D. SCHMADEL, H.D. DREW, University of Maryland, College Park, MD 20742, I. TSUKADA, Y. ANDO, Materials Science Research Laboratory, CRIEPI, Tokyo, Japan

— We report a study of magneto-optical properties in the mid-infrared region of a series of La$_{2-x}$Sr$_x$CuO$_4$ samples with hole doping level ranging from severely underdoped ($x = 0.03$) to optimally doped ($x = 0.15$). The Faraday rotation and circular dichroism are measured in a magnetic field of 8 Tesla and in a temperature range between 30K and 300K. The doping and temperature dependence of infrared Hall angle is found to be consistent with a simple Drude model. A significant increase of Hall frequency is observed when the hole doping level is reduced from optimal doping, which is consistent with a drastic reduction of the volume of Fermi surface in the underdoped sample. These results are similar to results of an earlier study of underdoped YBa$_2$Cu$_3$O$_{6+x}$ [L. B. Rigal, et al., Phys. Rev. Lett. 93,137002 (2004)]. Both experiments will be compared with theoretical models of the IR Hall effect.

1The support of NSF grant DMR-0303112 is acknowledged

Howard Drew
University of Maryland

Date submitted: 15 Dec 2005

Electronic form version 1.4