Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Infrared Hall effect in underdoped and optimally doped $\mathbf{La_{2-x}Sr_xCuO_4}$[1] 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 $La_{2-x}Sr_xCuO_4$ 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 YBa2Cu3O6+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.

[1]The support of NSF grant DMR-0303112 is acknowledged

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Date submitted: 15 Dec 2005 Electronic form version 1.4