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IR Hall measurements in overdoped $Pr_{2-x}Ce_xCuO_4$: evidence for magnon induced current-vertex corrections[1] GREGORY S. JENKINS, DON C. SCHMADEL, R.L. GREENE, H.D. DREW, University of Maryland at College Park, P. FOURNIER, Universite de Sherbrooke, H. KONTANI, Nagoya University — In overdoped $Pr_{2-x}Ce_xCuO_4$, the dc Hall coefficient achieves its expected value $R_H \propto 1+x$ consistent with the large hole-like Fermi surface observed in ARPES, but only at low temperatures. As temperature is raised, the dc Hall coefficient falls off and becomes negative at a temperature that increases with x. We have measured the IR Hall angle of two overdoped $Pr_{2-x}Ce_xCuO_4$ samples at sufficiently low optical excitation energies (below 10meV) to directly probe the Fermi-surface properties. The observed large deviations from the classical result correspond to the addition of electron-like contributions to σ_{xy}, even at T=0, due to the finite frequency. Results of a model developed by H. Kontani of the low frequency IR Hall response which incorporates current-vertex corrections induced by magnon scattering are directly compared to the data. The model fully captures the salient features of the measured Hall response as a function of doping, temperature, and frequency. These results demonstrate that the anomalous Hall effect in the cuprates is a consequence of current vertex corrections to σ_{xy}.

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