Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Carrier mobility of insulating cuprates from time-resolved terahertz photoconductivity measurements J. STEVEN DODGE, Dept. of Physics, Simon Fraser University, JESSE C. PETERSEN, Dept. of Physics, Oxford University, AMIR D. FARAHANI, Dept. of Physics, Simon Fraser University, RUIXING LIANG, Dept. of Physics and Astronomy, University of British Columbia, IVAN BOZOVIC, Brookhaven National Laboratory — We study the ultrafast transient photoconductivity of three insulating cuprates, $Sr_2CuO_2Cl_2$, $YBa_2Cu_3O_6$, and La_2CuO_4. Terahertz spectroscopy reveals mobile dilute carriers, with a conductivity that appears promptly and decays non-exponentially in picoseconds. The peak photoconductivity is orders of magnitude larger than the static photoconductivity but smaller than that of chemically doped samples, with fast dynamics that depends weakly on material, concentration, and temperature. Decay dynamics indicate hopping transport with a low activation energy, suggesting weak to intermediate polaronic binding.

J. Steven Dodge
Simon Fraser University

Date submitted: 11 Nov 2011 Electronic form version 1.4