Abstract Submitted
for the MAR05 Meeting of
The American Physical Society

Complex Conductance Measurements of Ultra-thin MoGe films near the Superconductor-Insulator Transition[1] LUKAS URBAN, MICHAEL CALLAHAN, ALI YAZDANI, Department of Physics and Frederick Seitz Materials Research Laboratory, University of Illinois at Urbana-Champaign — The application of a magnetic field destroys the superconducting state and gives rise to unusual conducting or insulating states in two-dimensional samples. [1,2] This field-tuned transition has been extensively studied using conventional electrical transport measurements and analyzed within the context of critical behavior near a quantum phase transition. We report on a new approach to study the magnetic field-tuned transition using a two-coil mutual inductance technique, which has been integrated into a top-loading dilution refrigerator. Using this experimental setup, we have measured the complex conductance of $Mo_{43}Ge_{57}$ thin films as function of temperature and magnetic field. These measurements are used to determine the behavior of the superconducting electron density in the vicinity of the field-tuned transition. [1] A Yazdani and A. Kapitulnik *Phys. Rev. Lett.* **74**, 3037(1995). [2] N. Mason and A. Kapitulnik., *Phys Rev.* B **64**, 60504-1 (2001).

[1]This work was supported by NSF grants DMR-98-75565 and DMR-03-1529632, U.S. Department of Energy grant DEFG-02-91ER4539 through the Frederick Seitz Materials Research Laboratory and Office of Naval Research grant N000140110071.

Lukas Urban
Department of Physics and Frederick Seitz Materials
Research Laboratory, University of Illinois at Urbana-Champaign

Date submitted: 06 Dec 2004 Electronic form version 1.4