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Complex Conductance Measurements of Ultra-thin MoGe films near the Superconductor-Insulator Transition LUKAS URBAN, MICHAEL CALLAHAN, University of Illinois at Urbana-Champaign, ALI YAZDANI, Princeton University — The application of a magnetic field drives a two-dimensional superconductor through an unexpected conducting state into an insulating state. While this transition has been studied using electrical transport techniques, we present a different way to study the magnetic field-tuned transition. Using a two coil mutual inductance probe inside a top-loading dilution refrigerator, we measure the complex conductance of $\text{Mo}_{43}\text{Ge}_{57}$ thin films as we vary the temperature or apply a magnetic field. From the complex conductance we determine the superconducting electron density around this field-tuned transition. 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.

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