Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Evidence of Coulomb Drag between Anderson Insulators KAREEM ELSAYAD, JOHN CARINI, DAVID BAXTER, Indiana University — We report observations of Coulomb drag between 200 Angstrom thick co-sputtered insulating amorphous silicon-niobium alloy films, separated by a thin silicon-oxide barrier. An apparent linear-response regime for the transresistance is found to only exist over a narrow range of layer separations ($\sim$100 Angstroms) and material parameters (niobium concentrations $\sim$ 7%) at low driving currents ($\sim$1nA) and temperatures below $\sim$20 Kelvin. The temperature dependence, as well as the magnitude, of the transresistance in this regime is consistent with predictions for that between Anderson insulators with long ranged intra-layer Coulomb interactions, provided that the density of states of the silicon-niobium layers are taken to be that of effectively 3-dimensional systems. This is in contrast with measurements of the temperature dependence of the dc layer-conductivity in such bilayer systems, which suggest that transport should be effectively 2-dimensional at these energies. We will discuss the fabrication and characterization of bilayer samples, as well as possible explanations for the observed magnitude and temperature dependence of the transresistance.

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Date submitted: 27 Nov 2007 Electronic form version 1.4