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Microscopic transport in indium oxide thin films near the superconductor-insulator quantum phase transition MINSOO KIM, TAILUNG WU, ZHENZHONG SHI, ADAM STABILE, G. SAMBANDAMURTHY, University at Buffalo-SUNY, Buffalo, NY 14260 — We present results from low temperature (T) and high magnetic field (B) transport measurements on disordered thin films of amorphous indium oxide. Two-dimensional (2D) indium oxide films can be driven between insulating and superconducting ground states by controlled tuning of either the intrinsic disorder or external B. We have grown these films with hitherto unachieved control of their structure and property and patterned into Hall bars and nanowires using standard nanolithographic techniques for transport measurements. Here we present the results of a study of the resistance behavior in these films in the 1D and also in the 1D-2D crossover regimes when the ground state in the $T = 0$ limit is tuned from an insulator to a superconductor. Our efforts are aimed at achieving, for the first time, a continuously tunable 1D superconductor.

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