

Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Magnetic Field Enhanced Insulating Behavior in Thin Films with Local Cooper Pairing K. H. SARWA B. TAN, KEVIN A. PARENDO, University of Minnesota, Z. OVADYAHU, The Hebrew University, A. M. GOLDMAN, University of Minnesota — The effects of a perpendicular magnetic field on insulating amorphous indium oxide thin films exhibiting local superconductivity have been investigated. At very low temperatures the application of relatively low magnetic fields produces a giant positive magnetoresistance that increases with decreasing temperature. This suggests that the ground state in zero field may be a Cooper pair insulator. At nonzero temperatures a magnetic field enhances this insulating behavior. The low temperature I-V characteristics exhibit strong nonlinearities with threshold voltages for enhanced conduction whose magnitudes are independent of both temperature and magnetic field. This behavior indicates a connection with Cooper pairing and might be associated with the depinning of a charge structure. Although X-ray analyses characterize the films being amorphous, AFM images exhibit significant roughness that might be responsible for the formation of regions with a high local density of Cooper pairs. This work was supported in part by the National Science Foundation under grant NSF/DMR-0455121.

K. H. Sarwa B. Tan
University of Minnesota

Date submitted: 20 Nov 2006

Electronic form version 1.4