Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

The Role of Mesoscopic Disorder in Determining the Character of the Field-Induced Insulating regime of Amorphous Ultrathin Films[1] J.J. NELSON, Univ of Minn - Minneapolis, YEN-HSIANG LIN, University of Michigan, ALLAN GOLDMAN, Univ of Minn - Minneapolis — A series of quench-condensed amorphous Bismuth films of different thicknesses were shown to exhibit nonmonotonic magnetoresistances and Arrhenius conduction in the magnetic field induced insulating regime. Neither behavior is found in similar measurements carried out on amorphous Bismuth films grown on smooth, thin, amorphous Antimony underlayers. Arrhenius behavior is found for films grown on thicker Antimony underlayers. *Ex situ* Atomic Force Microscopy measurements of a series of Antimony films of different thicknesses showed that the mesoscopic scale roughness of the surface increased with increasing thickness. This suggests that film roughness plays the role of nucleating superconducting clusters through thickness variations in the subsequently deposited amorphous Bismuth layer. The properties of the insulating regime appear to depend upon the level of mesoscopic scale disorder.

[1]Supported in part by the National Science Foundation under Grant DMR-1263316.

J.J. Nelson
Univ of Minn - Minneapolis

Date submitted: 15 Nov 2013 Electronic form version 1.4