

University of New Hampshire

University of New Hampshire Scholars' Repository

Physics Scholarship

Physics

3-2011

Cooper pair localization in a-Bi thin films near the superconductor-insulator transition

Shawna M. Hollen

University of New Hampshire - Main Campus

H Q. Nguyen

Brown University

E. Rudisaile

Brown University

J Shainline

Brown University

G. E. Fernandes

Brown University

See next page for additional authors

Follow this and additional works at: https://scholars.unh.edu/physics_facpub



Part of the [Physics Commons](#)

Recommended Citation

<http://meetings.aps.org/link/BAPS.2011.MAR.A25.5>

This Conference Proceeding is brought to you for free and open access by the Physics at University of New Hampshire Scholars' Repository. It has been accepted for inclusion in Physics Scholarship by an authorized administrator of University of New Hampshire Scholars' Repository. For more information, please contact Scholarly.Communication@unh.edu.

Authors

Shawna M. Hollen, H Q. Nguyen, E. Rudisaile, J Shainline, G. E. Fernandes, J M. Xu, and J M. Valles Jr.

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Cooper pair localization in a-Bi thin films near the superconductor-insulator transition¹ S.M. HOLLEN, H.Q. NGUYEN, E. RUDISAILE, J. SHAINLINE, Brown University, Department of Physics, G. FERNANDES, J.M. XU, Brown University, Division of Engineering, J.M. VALLES, JR., Brown University, Department of Physics — Ultrathin films near the Superconductor-Insulator Transition (SIT) can exhibit Cooper pair transport in their insulating phase. This Cooper Pair Insulator state is achieved in amorphous Bi films patterned with a nanohoneycomb array of holes. We will present evidence from a number of experiments on these substrates supporting that 1) thickness variations, which result in variations in T_c and Δ , serve to localize the Cooper pairs; 2) the weak links between these superconducting islands control the SIT. Finally, we will discuss our most recent experiments that aim to characterize this Cooper pair insulator state and confirm the role of the thickness variations in the localization of Cooper pairs.

¹This work was supported by the NSF through No. DMR-0907357, by the AFRL, and by the ONR.

S. M. Hollen
Brown University, Department of Physics

Date submitted: 23 Dec 2010

Electronic form version 1.4