Mo/Au Bilayer TES Resistive Transition Engineering

G. Wang\textsuperscript{1}, C. L. Chang\textsuperscript{1,2,3}, V. Yefremenko\textsuperscript{1}, V. Novosad\textsuperscript{4}, J. Pearson\textsuperscript{4}, R. Divan\textsuperscript{5}, and J. E. Carlstrom\textsuperscript{1,2,3,6,7}

\textsuperscript{1}High Energy Physics Division, Argonne National Laboratory, 9700 S Cass Ave., Argonne, IL 60439 USA
\textsuperscript{2}Kavli Institute for Cosmological Physics, University of Chicago, 5640 South Ellis Avenue, Chicago, IL 60637 USA
\textsuperscript{3}Department of Astronomy and Astrophysics, University of Chicago, 5640 South Ellis Avenue, Chicago, IL 60637 USA
\textsuperscript{4}V. Novosad and J. Pearson are with the Materials Science Division, Argonne National Laboratory, 9700 S Cass Ave., Argonne, IL 60439 USA
\textsuperscript{5}Center for Nanoscale Materials, Argonne National Laboratory, 9700 S Cass Ave., Argonne, IL 60439 USA
\textsuperscript{6}Enrico Fermi Institute, University of Chicago, 5640 South Ellis Avenue, Chicago, IL 60637 USA
\textsuperscript{7}Department of Physics, University of Chicago, 5640 South Ellis Avenue, Chicago, IL 60637 USA

Abstract — We have investigated two types of superconducting Transition Edge Sensors (TES) modified with structures on the surface. One is a Mo/Au TES modified with Nb stripes, which increase the transition temperature and broaden the transition width. Another is a Mo/Au TES modified Au stripes, which decrease the transition temperature and broaden the transition width. It is experimentally demonstrated that the resistive transition profile of a TES can be desirably engineered with a superconductor and/or a normal metal by properly choosing the width and spacing of the modification stripes on the surface.

Keywords (Index Terms) — Superconductivity, proximity effect, transition edge sensor, bolometer.