Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Surface damage of SmB_6 through ion-irradiation NICHOLAS WAKEHAM, YONGQIANG WANG, Los Alamos National Laboratory, ZACHARY FISK, University of California, Irvine, FILIP RONNING, JOE THOMPSON, Los Alamos National Laboratory — SmB_6 is a Kondo insulator, but there is strong evidence for an intrinsic conductive surface state at low temperatures. Theoretical work indicates that SmB_6 may be a topological Kondo insulator with a topologically protected surface state that is robust against time-reversal invariant perturbations. To investigate this robustness, we have used non-magnetic ion-irradiation to damage the (001) surfaces of SmB_6 single crystals to varying depths, and have measured the resistivity as a function of temperature for each depth of damage. We observe a reduction in the residual resistivity with increasing depth of damage. Our data are consistent with a model in which the surface state is not destroyed by the ion-irradiation, but instead the damaged layer is poorly conducting and the initial surface state is reconstructed below the damage. This behavior is consistent with a surface state that is topologically protected. Investigations of time-reversal symmetry breaking perturbations of the surface layer, with magnetic ion-irradiation, will also be discussed.

Nicholas Wakeham
Los Alamos National Laboratory

Date submitted: 10 Nov 2014 Electronic form version 1.4