Colloquium

Department of Physics, Temple University

Imaging the Surface States of a Strongly Correlated Topological Insulator

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The prediction and subsequent discovery of robust spin-polarized surface states on topological band insulators has launched a new subfield of physics over the last decade. In the last few years it has been recognized that even more interesting, exotic, and potentially useful states of matter can arise when topology is combined with strong correlations. Strong correlations can lead to new topological classifications, fractionalized states, and many-body localization that preserves the topology of the insulating state against thermal destruction. The Hoffman lab has very recently achieved the first direct proof of a strongly correlated topological insulator. Using scanning tunneling microscopy to probe real and momentum space structure, our measurements on the heavy fermion material SmB_6 reveal the evolution of the insulating gap arising from strong interactions. Within the narrow gap, we directly image a dispersing surface state that converges to a Dirac point close to the chemical potential. Our observations present the first opportunity to explore a strongly correlated topological state.

Monday, November 28, 2016 at 3:00pm
SERC, Room 116
Refreshments served at 2:45pm