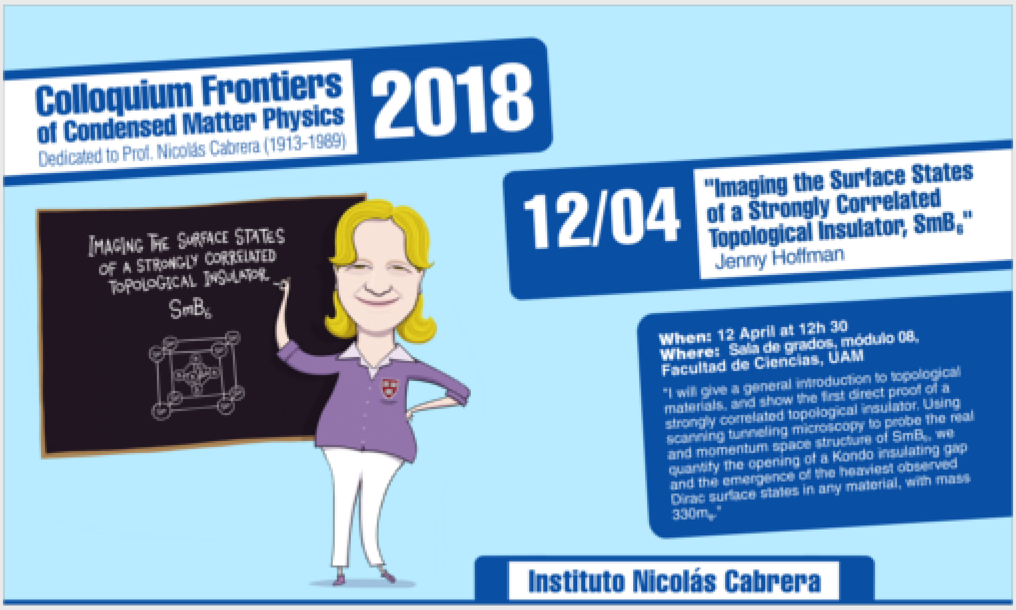
Imaging the Surface States of a Strongly Correlated Topological Insulator, SmB6



INC COLLOQUIUM – OFFICIAL ANNOUNCEMENT

Title: Imaging the Surface States of a Strongly Correlated Topological Insulator, SmB6.
When: 12 April, 2018, 12h30
Where: Sala de Grados, Módulo 08, Faculty of Science, UAM.
Speaker: Jenny Hoffman, Department of Physics, Faculty of Arts And Sciences, Harvard University, USA.

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. When topology is combined with strong electron correlations, even more interesting states of matter can arise, such as quantum anomalous Hall states, fractionalization, non-Abelian exchange statistics, and many-body localization that preserves the topology of the insulating state against thermal destruction. Here I will give a general introduction to topological materials, and show the first direct proof of a strongly correlated topological insulator. Using scanning tunneling microscopy to probe the real and momentum space structure of SmB6, we quantify the opening of a Kondo insulating gap. Within that gap, we discover linearly dispersing surface states with effective masses reaching m = (330±20)me, the heaviest observed Dirac states in any material. The prodigious density of the Dirac states near zero energy magnifies both their susceptibility to novel orders, and their potential utility. Our observations present the first opportunity to explore a strongly correlated topological state of matter.