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Visualizing topological quantum states with the STM: dirac, weyl, and majorana fermions

Ali YAZDANI

Department of Physics, Princeton University, USA

I will describe a series of experiments from our group over the last few years in which we have used the STM to probe topological electronic states--from those in topological insulators, semimetals, and superconductors. Many of these electronic phases are defined by their boundary modes, such as Dirac or Majorana fermions, and STM is a powerful way to search for these excitations and probe their properties. In particular, I will focus on our recent work on Dirac and Weyl semimetals and study of chains of magnetic atoms on the surface of a superconductor that provides a model system for creating a topological superconductor and realizing Majorana fermion in a condensed matter setting.

References:

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- S. Jeon, et al. Nature Materials 13, 851-856 (2014).