Abstract

Topological insulators and superconductors are new quantum states of matter that are characterized by nontrivial topological structures of the Hilbert space. Recently, they attract a lot of attention because of the appearance of exotic quasiparticles such as spin-helical Dirac fermions or Majorana fermions on their surfaces, which hold promise for various novel applications. In this colloquium, I will introduce the basics of those materials and present some of the breakthroughs we have made in this new materials frontier.