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Topological Insulators and Superconductors

Topological insulators and superconductors are new quantum states of matter that are characterized by nontrivial topological structures of the Hilbert space [1]. Recently, they attract a lot of attention because of the appearance of exotic quasiparticles such as spin-momentum-locked Dirac fermions or Majorana fermions on their surfaces, which hold promise for various novel applications [2]. In this talk, I will introduce the basics of those materials and present some of the key contributions we have made in this new frontier.

[1] Y. Ando, Topological Insulator Materials, J. Phys. Soc. Jpn. 81, 102001 (2013).

[2] Y. Ando and L. Fu, Topological Crystalline Insulators and Topological Superconductors: From Concepts to Materials, Annu. Rev. Condens. Mater Phys. 6, 361 (2015).