



清华大学高等研究院

Institute for Advanced Study, Tsinghua University

物理学术报告 Physics Seminars (biweekly)

Title: Topological invariants: classification and diagnosis

Speaker: Chen Fang (*IOP, CAS*)

Time: 4:00pm, Tuesday, Feb. 26, 2019
(3:30~4:00pm, Tea and Coffee)

Venue: Conference Hall 322, Science Building, Tsinghua University

Abstract

In this talk, I will introduce the two theoretical papers and one numerical paper that lead to the establishing of the "Catalogue of Topological Electronic Materials". In the theoretical work, my collaborators and I exploited the theory of symmetry-based indicators (or topological quantum chemistry) and that of real-space construction of topological crystalline states, and found the exhaustive mappings from the symmetry eigenvalues of valence bands to their topological invariants. In the numerical work, these mappings are applied to designing a fully automated, fast diagnosis method for topological materials. The method is then used to find as many as 8000 topological materials among over 40000 materials that are registered in popular materials databases. A topological materials database is made based on these results.

References:

- 【1】 Z. Song, T. Zhang, Z. Fang and C. Fang, Nature Communications 9, 3530 (2018).
- 【2】 Z. Song, T. Zhang and C. Fang, Phys. Rev. X 8, 031069 (2018).
- 【3】 T. Zhang, Y. Jiang, Z. Song, H. Huang, Y. He, Z. Fang, H. Weng and C. Fang, arXiv:1807.08756 (to appear in Nature).