



## Weekly Seminar

### Topological classification and diagnosis of electronic bands

**Prof. Chen Fang (方辰)**

*Institute of Physics, Chinese Academy of Science*



**Time: 4: 00 pm, Feb. 20, 2019 (Wednesday)**

**时间: 2019年2月20日 (周三) 下午4:00**

**Venue: Room W563, Physics building, Peking University**

**地点: 北京大学物理楼, 西563会议室**

#### 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).

#### About the speaker

Chen Fang graduated from Peking University with a Bachelor of Science degree in 2004, and graduated from Purdue University in 2011 with a Doctor of Philosophy degree in physics. He was a postdoctoral research associate at Princeton University and Massachusetts Institute of Technology from 2011 to 2015. Chen Fang became an associate professor at Institute of Physics, Chinese Academy of Science in 2015, and a professor at the same institution in 2018. He has been in charge of a Youth 973 Project since 2016. Chen Fang's work in recent years is mainly in the field of topological band theory.