



量子物理学・ナノサイエンス第 63 回特別セミナー

Catalogue of topological electronic materials

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- 日程** : 5 月 29 日 (水) 15:00-16:00
- 場所** : 本館 2 階 284B 物理学系輪講室

概要

“Ten-fold way” table^[1] tells us that different spatial dimensions and symmetries correspond to different topological classes. However, this table only contains time-reversal symmetry, particle-hole symmetry and chiral symmetries, but not a crystalline symmetry. Discoveries for topological insulators^[2], topological crystalline insulators^[3], and high-order topological insulators^[4] make people realize that crystalline symmetries can bring new topological states and the diversity of symmetry-protected topological states in materials. Thus classification of topological states for the variety of crystalline symmetries becomes a vital issue.

In my talk, I will introduce a series of theoretical tools, such as compatibility relation^[5], symmetry-based indicator^[6], and indicator formulas^[7-9], which can help us to diagnose various topological states by considering time-reversal symmetry and crystalline symmetries. After that, I will show you how to use those theoretical tools to perform a high-throughput calculation^[10].

- [1] Chiu, *et al.* Reviews of Modern Physics, **88**, 035005 (2016).
- [2] Zhang *et al.* Nature Physics, **5**, 438 (2009).
- [3] Hsieh, *et al.* Nature Communications **3**, 982 (2012).
- [4] Schindler, *et al.* Science Advances **4**, eaat0346 (2018).
- [5] Bradlyn *et al.*, Nature **547**, 298 (2017).
- [6] Po *et al.*, Nature Communications **8**, 50 (2017).
- [7] Zhida Song, Tiantian Zhang *et al.* Nature Communications **9**, 3530 (2018).
- [8] Zhida Song, Tiantian Zhang *et al.* Physical Review X **8**, 031069 (2018).
- [9] Khalaf, *et al.* Phys. Rev. X **8**, 031070 (2018).
- [10] Zhang, *et al.* Nature **566**, 475 (2019).

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