

凝縮系物理学ゼミナール

Condensed Matter Seminar

Date: 13:30-15:00, Wednesday, 14 December 2022

Title: Point-gap topology of correlated systems

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Abstract:

In these years, non-Hermitian systems have been extensively studied because these systems exhibit exotic phenomena which do not have Hermitian counterparts[1,2]. So far, the non-Hermitian topology of non-interacting systems has been mainly studied. However, recently it became possible to experimentally tune both interactions and non-Hermiticity for cold atoms[3,4].

The above significant progresses pose the following open questions: correlation effects on the non-Hermitian topology. In particular, it is highly nontrivial whether correlations result in reduction of topological classifications as is the case of Hermitian systems[5].

We address this issue by focusing on the zero- and one-dimensional point-gap topology[6-8] which is unique topology of non-Hermitian systems. Our analysis elucidates that interactions can result in the reduction of point-gap topological classifications. We also demonstrate that the above reduction of the point-gap topology results in the fragility of exceptional points.

Reference:

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- [2] Y. Ashida, Z. P. Gong, and M. Ueda, *Adv. Phys.* 69, 249 (2020).
- [3] T. Tomita, et al., *Sci. Adv.* 3, e1701513 (2017).
- [4] Y. Takasu, et al., *Prog. Theor. Exp. Phys.* 2020, 12A110 (2020).
- [5] L. Fidkowski and A. Kitaev, *Phys. Rev. B* 83, 075103 (2010).
- [6] TY and Y. Hatsugai, *Phys. Rev. B* 104, 075106 (2021).
- [7] TY and Y. Hatsugai, *Phys. Rev. B* 106, 205147 (2022).
- [8] TY and Y. Hatsugai, arXiv:2211.08895.