

# 凝縮系物理学ゼミナール

## Condensed Matter Theory Seminar

Date: 13:30-15:00, Wednesday, 8 May 2024

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Title: General criterion for non-Hermitian skin effects and Fock space skin effects

Speaker: Mr. Kenji Shimomura

### Abstract:

Non-hermiticity of evolution operators appears in a wide range of physics, from classical to quantum systems, and has crucial roles in dynamics [1]. Non-Hermiticity enables macroscopic accumulation of bulk states, named non-Hermitian skin effects [2]. They are well-established for single-particle systems, but their proper characterization for general systems is elusive. In this talk, we propose a general criterion of non-Hermitian skin effects [3], which works for any finite-dimensional system evolved by a linear operator. The applicable systems include many-body systems. A system meeting the criterion exhibits enhanced non-normality of the evolution operator, accompanied by exceptional characteristics intrinsic to non-Hermitian systems. Applying the criterion, we discover a new type of non-Hermitian skin effect in many-body systems, which we dub the Fock space skin effect. We also discuss the Fock space skin effect-induced slow dynamics, which gives an experimental signal for the Fock space skin effect.

### References :

- [1] Y. Ashida, Z. Gong, and M. Ueda, *Adv. Phys.* **69**, 249, (2020).
- [2] S. Yao and Z. Wang, *Phys. Rev. Lett.* **121**, 086803 (2018).
- [3] K. Shimomura and M. Sato, arXiv:2403.13595 (2024).