

凝縮系物理学ゼミナール

Condensed Matter Seminar

Location: **Room 413**, School of Science Bldg. 5 (理学 5 号館 413 号室)

Date: **13:30-15:00**, Wednesday, 26 July 2017

“Topological classification for correlated electron systems”

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Abstract: In this decade, topological aspects of condensed matter systems attract much attention. In topological insulators/superconductors electron correlations are supposed to be negligible. Recently, however, it became clear that the topological phases can emerge even in correlated compounds, such as SmB_6 . These results urge us to elucidate correlation effects on the topological phases. As the results of extensive studies, a remarkable theoretical progress has been made: Z classification of topological phases at free fermion level is reduced to Z_n ($n=4,8,16$ etc.) due to correlations[1]. In spite of this progress, there are still several questions to be addressed. (i) In most cases, the reduction is addressed based on a field theory, and thus, microscopic understanding based on numerical simulations is poor[2]. (ii) There are few experimental plat forms to observe the reduction[3].

We have addressed above questions and have found the following results. (i) Our real-space dynamical mean field simulation elucidates that a Mott insulator emerges only around edges when the reduction occurs. (ii) We point out that $\text{CeCoIn}_5/\text{YbCoIn}_5$ superlattices can be a plat form of the reduction.

References:

- [1] L. Fidkowski and A. Kitaev, Phys. Rev. B **83**, 075103 (2011).
- [2] T. Yoshida and N. Kawakami, Phys. Rev. B **95**, 045127 (2016).
- [3] T. Yoshida, *et al.*, Phys. Rev. Lett. **118**, 147001 (2017).