

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, 20 June 2018

“Magnetic Multipole Fluctuation and Superconductivity in Locally Noncentrosymmetric Crystal”

Speaker:

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Abstract:

Recent intensive research in locally noncentrosymmetric (NCS) crystals has revealed that odd-parity multipole order would be realized in several materials, such as BaMn_2As_2 [1], Sr_2IrO_4 [2], $\text{Cd}_2\text{Re}_2\text{O}_7$ [3], and SrTiO_3 [4]. These materials have been studied from the view point of the odd-parity multipole. Superconductivity near the odd-parity electromagnetic multipole order may invoke an unconventional pairing mechanism induced by an odd-parity multipole fluctuation. Intriguingly, because the antiferromagnetic (AFM) order in locally NCS crystals with the sublattice-dependent antisymmetric spin-orbit coupling (ASOC) stabilizes the odd-parity multipole order, AFM-fluctuation-induced superconductivity will naturally reveal the superconductivity owing to the odd-parity fluctuation. However, theoretical studies based on microscopic models have not been conducted, except for a few works [5]. Here, we study a microscopic model and show that two odd-parity superconductivities are realized near the parity-violating magnetic order.

References:

- [1] H. Watanabe and Y. Yanase, *Phys. Rev. B* **96**, 064432 (2017)
- [2] L. Zhao *et al*, *Nat. Phys.* **12**, 32 (2016)
- [3] L. Fu, *Phys. Rev. Lett.* **115**, 026401 (2015)
- [4] C. W. Rischau *et al*, *Nat. Phys.* **13**, 643 (2017)
- [5] V. Kozii and L. Fu *Phys. Rev. Lett.* **115**, 207002 (2015)