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, 19 February 2020

“Theoretical study of nonlinear electronic transport of odd-parity magnetic multipole systems”

Speaker:

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Abstract:

The multipole degree of freedom, which arises from the entanglement of spin, orbital, and sublattice, has attracted much attention. Particularly, peculiar itinerant properties and cross-correlated responses are induced by the spontaneous multipole order accompanying the parity violation, which is called as odd-parity multipole order [1]. Although there are a lot of theoretical/experimental efforts, further investigations should be required to elucidate the nature of odd-parity multipole order.

One of powerful probes of parity-violation is a non-linear response. For instance, the second order non-linear electronic conductivity (dichromatic transport/ non-reciprocal transport) is a characteristic response of parity-violated systems. Historically, the phenomenon was elaborately studied by Rikken et al., and it was revealed that the response is greatly enhanced in spin-orbit coupled semiconductor /superconductor [2]. Furthermore, a geometrical effect on non-linear responses has been extensively studied both in theoretical and in experimental studies [3].

In our work, we present a theoretical study of nonlinear conductivity in the odd-parity magnetic multipole systems. The system shows the parity-violation due to the magnetic order and possesses the itinerant property which is different from the systems in previous studies. We would discuss the symmetry analysis and microscopic calculations of the dichromatic transport with the model of Mn-based odd-parity magnetic multipole ordered materials [4].

References:

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