量子物理学・ナノサイエンス第 35 回特別セミナー

Topological Magnon Matter and Transverse Magnon Transport

講師 ： **Mr. Alexander Mook**

Max Planck Institute of Microstructure Physics, Halle (Saale), Germany

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概　要

Magnons are carriers of spin and heat, and can show transverse transport phenomena, one example being the thermal magnon Hall effect [1]. As in the case of electrons, this Hall-type transport is related to the topologically nontrivial magnon spectrum, that is, to k-space Berry curvature [2,3]. In this talk, I give an introduction to topological magnon matter. In particular, I present the magnonic pendants to electronic topological insulators [4], Weyl semimetals [5,6], and nodal-line semimetals [7].Thereafter, I introduce a method based on atomistic spin dynamics simulations for the calculation of magnon transport tensors, describing the response of a classical spin cluster to a magnetic-field gradient and a temperature gradient. It is applied to both a ferromagnetic topological magnon insulator [8] and a skyrmion crystal phase induced by frustration [9]. Magnon Hall angles as large as 60 % are predicted.

References
[1]　Y. Onose *et al.*, Science **329**, 297 (2010)
[2]　H. Katsura *et al.*, Phys. Rev. Lett. **104**, 066403 (2010)
[3]　R. Matsumoto *et al.*, Phys. Rev. Lett. **106**, 197202 (2011)
[4]　L. Zhang *et al.*, Phys. Rev. B **87**, 144101 (2013)
[5]　F.-Y. Li *et al.*, Nature Commun. **7**, 12691 (2016)
[6]　A. Mook *et al.*, Phys. Rev. Lett. **177**, 157204 (2016)
[7]　A. Mook *et al.*, Phys. Rev. B, *accepted* (2016/17)
[8]　A. Mook *et al.*, Phys. Rev. B **94**, 174444 (2016)
[9]　A. Mook *et al.*, Phys. Rev. B (R), *accepted* (2016/17)

連絡教員　物理学系　村上　修一（内線 2747）