

660th ASRC Seminar

Date : Wednesday, March 22, 10:00 ~

Location : Room 302, ASRC bldg.

Speaker : Dr. Kouki Nakata
(University of Basel)

Title: Magnon Transport in Insulating Magnets

Abstract: Quantum-statistical mechanics provides two kinds of particles; bosons and fermions. Electrons are fermions bounded by the Pauli exclusion principle, while magnons, Nambu-Goldstone modes in insulating magnets, are bosons free from it. Still, can magnon transport be similar to electrons ? Our answer is 'Yes'. Strongly motivated by rapid progress of magnonics experiment [1], we found magnon counterparts of electron transport [2]; magnonic Wiedemann-Franz law, magnon Josephson effects in quasi-equilibrium condensation with a quantized persistent current by Aharonov-Casher effects, and magnonic quantum Hall effect etc. Those are discussed in detail. We thus provide a universal thermomagnetic relation for magnon transport and give a handle to electromagnetically control magnon transport.

[1] S. O. Demokritov et al., Nature 443, 430 (2006); Y. Kajiwara et al., Nature 464, 262 (2010); Y. Onose et al., Science 329, 297 (2010); X. Zhang et al., Phys. Rev. Lett. 113, 037202 (2014); D. A. Bozhko et al., Nat. Phys. 12, 1057 (2016).

[2] KN, Kevin A. van Hoogdalem, Pascal Simon (PS), and Daniel Loss (DL), Phys. Rev. B 90, 144419 (2014); KN, PS, and DL, Phys. Rev. B 92, 014422 (2015); KN, PS, and DL, Phys. Rev. B 92, 134425 (2015); KN, Jelena Klinovaja, and DL, arXiv:1611.09752 (2016); KN, PS, and DL, arXiv:1610.08901 (2016).

<Contact>

Jun'ichi Ieda (81-3449)

Advanced Science Research Center