



509th ASRC Seminar



Date: 13:30 ~14:45, 17 April

Location: Meeting room 103, ASRC Building

Speaker: Dr. Junichiro Ohe
(Toho University)

Title: Topological chiral spin-wave edge
modes in magnonic crystals

Topological phase in condensed matter physics has been attracted because of the robustness of physical properties against the perturbative field.

The quantum Hall effect is typical phenomena described by the topological Chern number that indicates the edge mode of the conduction electrons. This Chern number is calculated by the Bloch wave functions of the 2-dimensional electron gas in a high magnetic field. Recent work on the photonic crystal has also clarified that the topological argument can be applied not only for the electron wave but also for the classical light wave.

In this report, we propose the topological magnonic crystal that provides chiral edge mode for spin waves. We theoretically design a couple of periodically-structured ferromagnetic models which supports unidirectional (chiral) propagations of spin waves along its sample boundaries in their dipolar regime. We present the numerical simulations obtained by solving the Landau-Lifshitz-Gilbert equation that describes the dynamics of magnetic moments. We show the interference of these edge modes provides a new logical circuit using the magnetic materials.



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