Underlying chiral soliton in chiral magnets

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Abstract

In magnetic compounds with broken inversion symmetry, the handedness of the underlying crystal structure imposes specific Dzyaloshinskii-Moriya (DM) magnetic interactions. These are responsible for the formation of long-period spatial modulation of the magnetization with a fixed rotation sense (chiral modulations), usually in a form of one-dimensional helical structure or two-dimensional (2d) skyrmion lattices.

For those chiral modulations, magnetic field and temperature play roles of control parameters and thus the magnetic phase diagram should be clarified and understood in a comprehensive way as one of the central issues in the research field of chiral magnets. In this talk, I will show that a physical picture based on underlying chiral soliton gives us insight to understand thermodynamic properties and spin structures in chiral magnets that have chiral soliton lattice as an ordered phase.

I will also discuss theoretically the metastability and hysteresis observed in CrNbS.
These works have been done in collaborations with M. Shinozaki, Y. Masaki, S. Hoshino, A. Leonov, J. Kishine and Y. Togawa.

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