Seminar: Hard Condensed Matter Theory

Room: Galileo room, 01-128 (Staudinger Weg 9)
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Dispersion and Berry curvature of spin wave in ferromagnets

Berry curvature is related to gauge field and studied in many systems such as electron, photon, and quasi particles. One of interesting point to study Berry curvature of spin wave in ferromagnets is change of effective interactions by sample geometry and thickness. In general, Berry curvature of spin wave is zero with only exchange interaction. Dipolar interaction and Dyaloshinskii-Moriya interaction are well known to give rise to non-zero Berry curvature. Effective range and mechanism are different between two interactions.

We recently calculated Berry curvature of spin waves in ferromagnetic films with dipolar and exchange interactions. In this regime, the exchange interaction makes the dispersion change dependent on the thickness. The resulting Berry curvature reproduces that in previous works in the magnetostatic limit. In addition, we found that the Berry curvature of magnons in the dipole-exchange range has a peak at the crossings of the eigen modes, where hybridizations between the modes are significant.

In this presentation, I introduce example of Berry curvature and novel phenomena in some systems at first. After that, I discuss Berry curvature of spin wave in ferromagnets, its application, and possibility at the last of presentation.

All interested are cordially welcome!
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