

Spin dynamics in disordered systems and in the presence of the compass anisotropy

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In the past few years there has been increasing interest in anisotropies that crucially influence the spin dynamic of a system beyond the Dzyaloshinskii-Moriya interaction (DMI). One interesting candidate is the highly direction-dependant compass anisotropy [¹], which can lead to the creation of Skyrmions without DMI. This anisotropy has its roots, similarly to DMI, in spin-orbit coupling but in contrast to DMI it favors directional alignment of spins along specified axes. In order to investigate this, we extend the total effective field in the classical LLG by a term that stores the effective field with regard to this additional anisotropy and examine the resulting spin dynamics.

Additionally we consider disordered systems, that is, systems that give rise to occupation probabilities of certain atomic types. This can not only lead to different elements at specific sites but also to empty sites, which is important when trying to understand realistic material defects. Furthermore, we wish to investigate not only $T = 0\text{K}$ dynamics but also are interested in the dynamics of the system with non-vanishing temperatures. As this is currently still a working progress, there is limited data available but it is expected that clear insights as well as further developments are present at the time of the conference.

¹[] Zhen Tao Wang, Ying Su, Shi-Zeng Lin, and Cristian D. Batista. Meron, skyrmion, and vortex crystals in centrosymmetric tetragonal magnets. *Phys. Rev. B*, 103:104408, Mar 2021