Seminar: Hard Condensed Matter Theory

JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Room: Lorentz Room 05-127 (Staudingerweg 7)
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Spin transport in frustrated magnets

Spintronics offers new routes towards the design of energy-efficient architectures to be implemented in the next generation of high-speed electronic devices. However, it also faces the problem of fast degradation of spin signals resulting from decoherence processes. Topological protection of spin textures seems to play a fundamental role in overcoming this issue and leads to long relaxation lengths. This robustness usually relies on the existence of an underlying rotational symmetry in spin space (e.g, the U(1) symmetry associated with conventional effective spin superfluids), which breaks down in the presence of parasitic (relativistic) interactions. In magnetic systems with frustrated interactions dominated by exchange, these symmetry-breaking interactions become 'averaged-out' at the macroscopic level and the topological robustness is effectively restored. In this talk, I will discuss recent theoretical advances in the long-ranged transport of spin in materials with frustrated (magnetic) interactions, with special attention to that mediated by the spin-superfluid state [1] and skyrmions in the SO(3) order parameter [2].

[1] H. Ochoa, R. Zarzuela and Y. Tserkovnyak, Phys. Rev. B 98, 054424 (2018)
[2] R. Zarzuela, H. Ochoa and Y. Tserkovnyak, arXiv:1901.01208 (2019)

All interested are cordially welcome!

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