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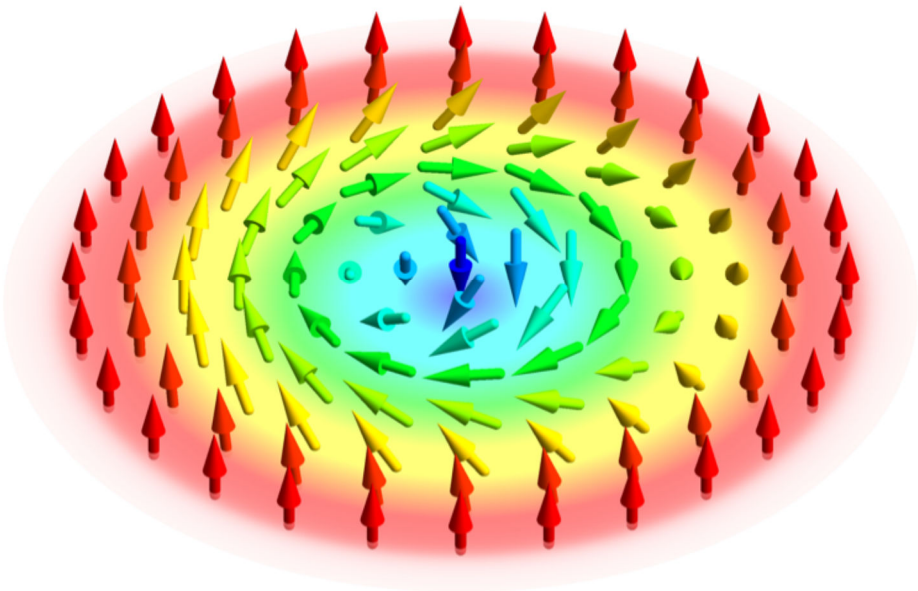
Fakultät für Mathematik und Physik
Albert-Ludwigs-Universität Freiburg
Physikalisches Institut

SONDERKOLLOQUIUM

AM 19. NOVEMBER 2015 UM 15:30 UHR

IM HÖRSAAL II, PHYSIK-HOCHHAUS

EXCITING SKYRMIONS AND HELICES IN CHIRAL MAGNETS



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Chiral magnets like MnSi, $Fe_{1-x}Co_xSi$, or Cu_2OSeO_3 gain Dzyaloshinskii-Moriya spin-orbit energy by twisting the magnetization on a long length scale giving rise to spatially modulated magnetic textures like helices and skyrmion crystals. The spin-wave excitations exhibit Bragg scattering of these textures resulting in a magnon band structure in accordance with Bloch's theorem. We first discuss the magnetic resonances that probe the magnon spectrum at zero momentum. While the helix supports two resonances, there are three resonances within the skyrmion crystal corresponding to two gyration modes and a breathing mode [1]. In the second part, we elaborate on the magnon excitations at finite momenta that have been recently resolved in the helimagnetic phase with the help of inelastic neutron scattering [2]. Finally, we discuss the magnon-skyrmion scattering problem [3,4].

[1] T Schwarze, J Waizner, M. Garst, A Bauer, I Stasinopoulos, H. Berger, Christian Pfleiderer, and D Grundler, Nature Materials **14**, 478 (2015).
[2] M. Kugler, G. Brandl, J. Waizner, M. Janoschek, R. Georgii, A. Bauer, K. Seemann, A. Rosch, C. Pfleiderer, P. Böni, and M. Garst, Phys. Rev. Lett. **115**, 097203 (2015).
[3] C. Schütte and M. Garst, Phys. Rev. B **90**, 094423 (2014).
[4] S. Schroeter and M. Garst, Low. Temp. Phys. **41**, 817 (2015).