Institute for Materials Science

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CMMS Colloquium - Sponsored by IMS

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Exciting Skyrmions and Helices in Chiral Magnets

Wednesday, August 26, 2015
3:00 - 4:00 pm
IMS/MPA Conference Room (TA3-0032-134)

Abstract: Chiral magnets like MnSi, Fe1-xCoxSi, or Cu2OSeO3 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 [2] that have been recently resolved in the helimagnetic phase with the help of inelastic neutron scattering [3].

[1] *T Schwarze, J Waizner, Markus Garst, A Bauer, I Stasinopoulos, H. Berger, Christian Pfleiderer, and D Grundler, Nature Materials 14, 478 (2015).*
[2] *C. Schütte and M. Garst, Phys Rev B 90, 094423 (2014).*
[3] *M. Kugler, G. Brandl, J. Waizner, M. Janoschek, R. Georgii, A. Bauer, K. Seemann, A. Rosch, C. Pfleiderer, P. Böni, and M. Garst, arXiv: 1502.06977 (accepted in Phys. Rev. Lett.)*

Bio: Markus received his PhD in physics from the University of Karlsruhe (Germany) in 2004 working on quantum phase transitions in heavy-fermion compounds. Afterwards he spent two years between 2004 and 2006 as a postdoc at the University of Minnesota (USA) working with L. Glazman on the Kondo effect and transport in one-dimensional systems. Since 2006 he is at the University of Cologne. His research interests are strongly correlated systems in general and, in particular, phenomena with spin-orbit coupling like chiral magnets and skyrmions.

This colloquium talk and and Markus's visit at LANL are supported by Institute fore Material Science (IMS) at LANL.
Markus is visiting LANL from 08/24 to 09/04. If you would like to meet with Markus during his visit please contact Marc Janoschek (mjanoschek@lanl.gov)

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