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Quantum order in chiral magnets: 3D Non-Fermi Liquid Phase and Blue Quantum Fog in MnSi¹

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The discovery of a distinct change from Fermi liquid to non-Fermi liquid resistivity and the observation of partial magnetic order in MnSi under high pressure [1,2] has generated great scientific interest in the properties of itinerant-electron systems with weak chiral spin-orbit interactions. Recent theoretical predictions include the spontaneous formation of a skyrmion phase at the boundary of conventional helical order [3] and the existence of a new type of Goldstone-like excitation, so called helimagnons [4]. New experimental work using sophisticated neutron scattering techniques and bulk properties exploring the question of skyrmion textures and helimagnon excitations, as well as studies of the thermal expansion under pressure using a newly developed ultra-high resolution neutron spin-resonance technique (Larmor diffraction) will be reviewed.

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- [4] D. Belitz, T. R. Kirkpatrick, A. Rosch, Phys. Rev. B **73**, 054431 (2006).

¹work carried out in collaboration with: P. Böni, M. Janoschek, A. Neubauer, T. Keller and B. Roessli