9.7 cm

NON-COLLINEAR MAGNETIC ORDER IN ITINERANT-ELECTRON SYSTEMS

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A number of metallic Mn-compounds possess magnetic groundstates that display non-collinear order. In the localized-moment picture where one analyzes magnetism using the Heisenberg model, this causes only moderate attention, but if magnetism is to be explained by the spins of itinerant electrons then new concepts are required. Therefore, using density functional theory I will outline the necessary generalization of the appropriate Kohn-Sham equations, some important symmetry properties (that, in fact, were uncovered by Herring a long time ago) and examples of numerical results. Effects of spin-orbit interaction will be briefly considered.- Leaving ground-state properties I turn my attention to frozen non- collinear magnetic moment arrangements which can be used to simulate low-energy excitations and spin fluctuations. I explain attempts made to understand spin-waves and finite temperature properties of the elemental ferromagnets Fe, Co, and Ni as well as some selected metallic compounds and antiferromagnets. I will discuss the goals achieved and numerous open problems.

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