

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Theory of the helical spin crystal. A candidate for the partially ordered state of MnSi BENEDIKT BINZ, ASHVIN VISHWANATH, UC Berkeley, VIVEK AJI, UC Riverside — MnSi is an itinerant magnet which at low temperatures develops a helical spin density wave. Under pressure it undergoes a transition into an unusual partially ordered state whose nature is debated. Here we propose that the helical spin crystal (the magnetic analog of a solid) is a useful starting point to understand partial order in MnSi. We consider helical spin crystals with BCC structure (composed of superpositions of six different helical spin-density waves) and determine conditions under which they may be energetically favored. We introduce a Landau theory to study the properties of these states, in particular the effect of crystal anisotropy, magnetic field and disorder. These results compare favorably with existing data on MnSi from neutron scattering and magnetic susceptibility measurements. Future experiments to test this scenario are also proposed.

Benedikt Binz
UC Berkeley

Date submitted: 29 Nov 2005

Electronic form version 1.4