

Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Influence of spin-orbit interactions on the electronic structure and magnetic properties of IrMn alloys HUA CHEN, PANTELEIMON LAPAS, FENGCHENG WU, ALLAN H. MACDONALD, University of Texas at Austin — We will present a theoretical study of the electronic and magnetic properties of non-collinear antiferromagnetic metals with strong spin-orbit interactions, focusing on the particular case of the IrMn alloy. IrMn alloys are important antiferromagnetic materials often used as the pinning layer in spin-valve structures. Their electronic structure has so far not been extensively studied; in particular the influence of spin-orbit interactions which are strong in this material has not yet been addressed. We start from ab initio calculations for ordered IrMn₃ crystals, and analyze the relationships between band degeneracy, non-collinearity of the Mn spins, and the large spin-orbit coupling of Ir. We will also study the spin wave spectra in the ordered IrMn₃, and finally comment on the influence of transport currents on magnetization structure and dynamics in antiferromagnets in general, and non-collinear systems in particular.

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Date submitted: 09 Nov 2012

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