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Application of Novel Molecular Field Theory to Helical Antiferromagnetic Ordering in $EuCo_2P_2$[*] D. C. JOHNSTON, N. S. SANGEETHA, Iowa State Univ — A formulation of Weiss molecular field theory (MFT) was recently advanced for antiferromagnetic (AFM) systems of identical crystallographically-equivalent local moments interacting by Heisenberg exchange that does not utilize the concept of magnetic sublattices.[1] This formulation has the attractive feature that the magnetic and thermal properties in magnetic fields $H \rightarrow 0$ depend only on the interactions of a representative spin with its neighbors, and thus allows the properties of collinear and coplanar noncollinear AFM structures to be understood and modeled on the same footing. Neutron diffraction measurements showed that $EuCo_2P_2$ with the bct $ThCr_2Si_2$-type structure undergoes an AFM transition to a coplanar noncollinear c-axis helical AFM structure below the ordering temperature $T_N = 66.5$ K.[2] Here we report the properties and apply our MFT to model the anisotropic magnetic susceptibility of single-crystal $EuCo_2P_2$ below T_N.
1. D. C. Johnston, PRL **109**, 077201 (2012); PRB **91**, 064427 (2015).
2. M. Reehuis et al., J. Phys. Chem. Solids **53**, 687 (1992).
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