NONCOLLINEAR MAGNETIC STRUCTURES UNDER PRESSURE

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9.7 cm

In the intermetallic compounds $R_{1-x}R_x{}'Mn_2(Si,Ge)_2$, $RMn_{2-x}Fe_xGe_2$, below the Néel temperature T_N there appears a collinear magnetic structure of the AFl or AFil type, arranged of antiferromagnetic collinear (001) planes. As the temperature decreasing, both ferro- and antiferromagnetic Mn magnetic moment components coexist in each Mn layer. Consequently, the structure becomes noncollinear. The intralayer and interlayer interactions are the function of the Mn-Mn spacing, therefore the ground state of these compounds may be altered by any change of temperature or external pressure. The phenomenological a two-sublattice mean-field model disscussed in this study preasumes, that the two equivalent Mn sublattice magnetic moments are canted with 2θ canting angle. The magnetic properties of this magnetic system will be analyzed on the basis of the free energy which contains the exchange energy, the elastic energy, the entropy term, the pressure term and anisotropy energy. In additional the model preasumes a linear dependence of effective exchange integrals on relative exchanges of volume crystal. Minimizing energy with respect to θ, yelds same conditions for existence the collinear and noncollinear canted state. The conditions for the stability of the canted arrangement are also disscused.

13.4 cm

Subject category :

5. Phase Transitions and Critical Phenomena

Presentation mode :
poster

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