TEMPERATURE BEHAVIOR OF WEAK FERROMAGNETIC MOMENT IN MAGNETOELECTRIC $LiCoPO_4$

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9.7 cm

A study of the magnetization of the antiferromagnetic magnetoelectric crystal as a function of temperature and the strength of a magnetic field, which was directed along the main crystallographic axes, revealed the new interesting features due to the presence of a weak ferromagnetism along the antiferromagnetic axis. The temperature dependence of the weak ferromagnetic mument is non-monotonic. The maximum is close to $T = \frac{1}{2}T_N$ and the value of magnetization along b axis is equal to 0.12 G.

The revealed weak ferromagnetism raises the question of redefinition of a magnetic symmetry of the $LiCoPO_4$ crystal, as the earlier established magnetic symmetry group $Pnma'$ corresponds to the genuine antiferromagnetic structure and forbids a weak ferromagnetism. The structure admitting weak ferromagnetism can be either the slightly non-collinear uniform structure or the modulated one. Assuming that the magnetic structure is uniform the maximum on its temperature dependence owes its origin to in competition between mechanisms of canting of a magnetic sublattices. Under assumption of the magnetic modulated structure, the non-monotonous temperature dependence of the ferromagnetic moment can be a consequence of the temperature evolution of parameters of the magnetic modulation.

13.4 cm

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