NEUTRON DIFFRACTION STUDY OF FERROMAGNETIC ORDERING IN $La_{1/3}Nd_{1/3}Ca_{1/3}MnO_3$ INDUCED BY ELECTRIC FIELD

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9.7 cm

In many doped perovskite manganites a strong correlation between the magnetic structure and the electrical transport properties is reported. This fact is discussed in terms of the transition from the antiferromagnetic (AFM) insulator to the ferromagnetic (FM) metal. We used the neutron diffraction technique to study the FM ordering process in $La_{1/3}Nd_{1/3}Ca_{1/3}MnO_3$ induced by the short impulse of the external electric field E=4V/cm at a magnetic field H=1.5T. Our sample has been prepared by the standard solid-state reaction. The diffraction measurements at 4K, carried out for the neutron wavelength λ=0.2442nm, have revealed the orthorhombic perovskite structure with the unit-cell parameters: a=0.5480nm, b=0.5550nm and c=0.7737nm. We have observed that a short impulse of the electric field develops the FM ordering in a similar way as the magnetic field up to 4T. We assume that the increased FM ordering induced by the external electric field at a given magnetic field has the same physical origin as in the case of the Zener double exchange [1]. The novel effect is confirmed by magnetic moment measurements using vibrating sample magnetometer.

[1] C. Zener, Phys. Rev. **82**, 403 (1951).

13.4 cm

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