Contribution ID: **168** Type: **Talk (20 min + 5 min discussion)**

Exchange interactions and phase transitions in an external magnetic field in orthoferrites RFeO3 (R=Ho,Tb,Yb).

Thursday 8 December 2022 15:00 (25 minutes)

Rare-earth orthoferrites RFeO3 represent an interesting and importantnfamily of magneticncompounds. Their remarkable magnetic properties result from complex interactions between the moments of the 3d electrons on the transition metal and the 4f electrons on the rare-earth atoms.These interactions lead to the presence of magnetoelectric properties and to the magnetocaloric effect in compounds RFeO3. Its compounds crystallize in structure with the space group Pnma. At the Neel temperature which is typically in the range TN = 600 ÷ 700 K, the iron magnetic moments form a canted antiferromagnetic phase, where the Dzyaloshinsky-Moriya interaction is responsible for the canting of the Fe-sublattice.
We have performed studies of the TbFeO3 by triple-axis neutron spectroscopy on the PUMA (MLZ). The obtained exchange parameters between nearest neighbors for Fe3+ in TbFeO3 have different values for the exchange within the ac plane and along the b-axis: 4.55(2) meV against 4.77(1) meV. This result compares with our previous measurements of HoFeO3 [1] and data from literature for YbFeO3 [2]. Such approach allow us to describe spin reorientation transitions in an external magnetic field in terms of the energy balance of the system. This in good agreement with our experiments on neutron diffraction, which were performed on instruments POLI (MLZ) and D23 (ILL).

[1] A.K. Ovsyanikov, et al., JMMM 507 (2020)
[2] S. E. Nikitin, et al., Phys. Rev. B 98, (2018)

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