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Magnetism and dynamics in multiferroic antiferromagnet Ba2CoGe2O7

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Multiferroic Ba₂CoGe₂O₇ is well known for having an unconventional metal-ligand d-p hybridization mechanism responsible for the magnetically induced ferroelectricity [1,2]. It exhibits many exotic quantum phenomena, and among them anisotropic spin excitations and self-tunable single ion anisotropy under external applied magnetic field have been observed recently, using inelastic neutron scattering (INS) technique [3]. A spin gap of about 0.1 meV has been observed under zero magnetic field and interpreted as an effect of spinnematic interaction [4]. However, we have predicted such gap via linear spin wave theory by introducing the Dzyaloshinskii–Moriya interaction in the spin Hamiltonian. We have observed a spin gap of 0.105 meV in energy at 2 K under zero magnetic field and the gap energy decreases with increasing temperature. We enlighten the discussion on understanding the origin of the zero-field spin gap in details.

References:

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Primary author: Dr DUTTA, Rajesh (Institut für Kristallographie, RWTH Aachen University)

Co-authors: THOMA, Henrik; HUTANU, Vladimir

Presenter: Dr DUTTA, Rajesh (Institut für Kristallographie, RWTH Aachen University)

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