



Magnetism and dynamics in multiferroic antiferromagnet $\text{Ba}_2\text{CoGe}_2\text{O}_7$

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Multiferroic $\text{Ba}_2\text{CoGe}_2\text{O}_7$ 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 spin-nematic 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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