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Low energy spin dynamics of rare-earth orthoferrites YFeO_3 and LaFeO_3 ¹ KISOO PARK, HASUNG SIM, JONATHAN LEINER, Department of Physics and Astronomy, Seoul National University, YOSHIYUKI YOSHIDA, HIROSHI EISAKI, National Institute of Advanced Industrial Science and Technology (AIST), SHINICHIRO YANO, JASON GARDNER, Australian Nuclear Science and Technology Organisation, JE-GEUN PARK, Department of Physics and Astronomy, Seoul National University — YFeO_3 and LaFeO_3 are members of the rare-earth orthoferrites (RFeO_3) family with $Pbnm$ space group. With the strong superexchange interaction between Fe^{3+} ions, both compounds exhibit the room temperature antiferromagnetic order ($T_N > 600$ K) with a slight spin canting. Here we report low-energy magnetic excitation of YFeO_3 and LaFeO_3 using inelastic neutron scattering measurements, showing evidence of magnon mode splitting and a spin anisotropy gap at the zone center. Spin wave calculations with the spin Hamiltonian including both Dzyaloshinsky-Moriya interaction and single-ion anisotropy accounts for the observed features well. Our results offer insight into the underlying physics of other RFeO_3 with magnetic rare-earth ions or related Fe^{3+} -based multiferroic perovskites such as BiFeO_3 .

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