Abstract Submitted
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Electrically driven spin excitation in a ferroelectric magnet $DyMnO_3$ N. KIDA, Multiferroics Project, ERATO, JST, Y. IKEBE, Univ. Tokyo, Y. TAKAHASHI, J.P. HE, Y. KANEKO, Multiferroics Project, ERATO, JST, Y. YAMASAKI, Univ. Tokyo, R. SHIMANO, Multiferroics Project, ERATO, JST and Univ. Tokyo, T. ARIMA, Tohoku Univ., N. NAGAOSA, Univ. Tokyo and RIKEN, Y. TOKURA, ERATO-JST, Univ. Tokyo, and RIKEN — In multiferroic manganites, there have been recent experimental and theoretical arguments on the possibility of the presence of the low-lying spin excitation, called *electromagnon*, where the spin excitation electrically becomes active [1]. Here we report on a complete set of low-energy (1–10 meV) electrodynamics of spin excitations for a multiferroic $DyMnO_3$ with variations of the light polarization in a variety of phases tuned by both temperature (5–250 K) and magnetic field (0–70 kOe) [2]. We identify the pronounced absorption continuum (1–8 meV) with a peak feature around 2 meV, which is electric-dipole active only for the light E-vector along the a-axis. This absorption band grows in intensity with lowering temperature from the spin-collinear paraelectric phase above the ferroelectric transition, but irrespectively of the direction of the bc or ab spiral spin plane. The possible origin of this electric-dipole active band is argued in terms of the gigantic fluctuations of spins and spin-current. [1] A. Pimenov *et al.*, Nat. Phys. **2**, 97 (2006). [2] N. Kida *et al.*, arXiv:0711.2733

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