

Abstract Submitted
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Magnetolectric Emission in a Magnetic Ferroelectric Er-doped (Ba,Sr)TiO₃ YOSHI-AKI SHIMADA, Department of Applied Physics, University of Tokyo, MASAKAZU MATSUBARA, Correlated Electron Research Center, National Institute of Advanced Industrial Science and Technology, YOSHIO KANEKO, JING-PING HE, Spin Superstructure Project, ERATO, Japan Science and Technology Corporation, YOSHINORI TOKURA¹, Department of Applied Physics, University of Tokyo — In the system where both space-inversion (\mathcal{I}) and time-reversal (\mathcal{R}) symmetries are broken simultaneously, a nonreciprocal optical phenomenon termed the optical magnetolectric (OME) effect is expected to show up. As the crystal that has neither \mathcal{I} nor \mathcal{R} symmetry, we have investigated an Er³⁺-doped ferroelectric (Ba,Sr)TiO₃ single crystal under magnetic field in which the luminescent magnetic Er³⁺ ion occupies a noncentrosymmetric site. The k -directional dichroism derived from the OME effect was verified in the ${}^4I_{13/2} \rightarrow {}^4I_{15/2}$ emission by the reversal of magnetic field and spontaneous polarization. The observed nonreciprocity $\Delta I/I \sim 0.5\%$ at 3000 Oe implies the possibility of the application of the OME effect to the function of an optical isolator.

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