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**Correlation between magnetic, dielectric properties and strain in a $Mn_3O_4$ single crystal** T. SUZUKI, T. KATSUFUJI, Dept. of Physics, Waseda University — $Mn_3O_4$ has a tetragonally distorted spinel structure below 1443 K and exhibits a ferrimagnetic ordering at $T_N = 43$ K. This compound exhibits further magnetic phase transitions at 39 K and 33 K, where $Mn^{2+}$ and $Mn^{3+}$ spins are canted from the collinear spin structure. We measured the dielectric constant and strain of a $Mn_3O_4$ single crystal. We found that both dielectric constant and strain have clear anomalies at the magnetic transition temperatures. We also found that dielectric constant is suppressed (enhanced) by 2 % when magnetic field is applied parallel (perpendicular) to the direction of electric field within the *ab* plane below $T_N$. In addition, strain along the *ab* plane also has anisotropic magnetic field dependence. These results can be explained as follows: (1) There is an orthorhombic distortion below $T_N$, presumably induced by the orbital ordering of $Mn^{3+}$, (2) anisotropy of dielectric constant and strain within the *ab* plane appears due to the orthorhombic distortion, and (3) the alignment of crystalline domains with applied magnetic field occurs, resulting in the large magnetic field dependence of dielectric constant and strain.

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