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Purely Magnetic Nature of Spin-Reorientation Transitions in Orthoferrites. YA. B. BAZALIY, Instituut Lorentz, Leiden University and Dept. of Physics and Astronomy, University of South Carolina, L. T. TSYMBAL, V. N. DERKACHENKO, V. I. KAMENEV, O. Galkin Donetsk Physics and Technology Institute, National Academy of Science, Ukraine, G. N. KAKAZEI, Institute of Magnetism, National Academy of Science, Ukraine, F. J. PALOMARES, Instituto de Ciencia de Materiales de Madrid, Spain, P. E. WIGEN, Department of Physics, Ohio State University — Magnetic and structural characteristics of $ErFeO_3$, $TmFeO_3$ and $YbFeO_3$ single crystals were studied in the vicinity of the spin-reorientation transitions. In all crystals the behavior of the absolute value of the magnetization $M(T)$ and the rotation angle $\theta(T)$ are incompatible with the conventional Landau mean field theory but can be described with no fitting parameters by the proposed modified mean field theory. X-ray measurements found no symmetry-lowering lattice distortions and suggest a purely magnetic nature of the transition. Successful fitting of experimental data in several materials with a wide range of magnetic parameters demonstrates the generality of the proposed description of $\Gamma_4(G_x, F_z) \rightarrow \Gamma_{24}(G_{xz}, F_{xz}) \rightarrow \Gamma_2(G_z, F_x)$ orientation phase transitions in orthoferrites.

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