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Mechanism of Noncollinearity and Magnetoelectric Coupling in Incommensurate Multiferroics IVAN SERGIENKO, ELBIO DAGOTTO, Oak Ridge National Laboratory — Using extensive Monte-Carlo simulations of a modified orbitally degenerate double-exchange model applied to the multiferroic perovskites $R\mathrm{MnO}_3$ (R =Gd, Tb, Dy), we show that the spiral magnetic phase results from the interplay between the double exchange coupling, superexchange, Jahn-Teller and Dzyaloshinskii-Moriya (DM) interactions. The DM interaction also induces a small ferroelectric moment and provides the mechanism of the strong coupling between the unusual magnetism and ferroelectricity. We also discuss the magnetoelectric effects in the applied magnetic fields.

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