Anisotropic symmetric exchange as a new mechanism for multiferroicity.\textsuperscript{1} JUN-SHENG FENG, HONG-JUN XIANG, Fudan Univ — Discovering new magnetoelectric multiferroics is an exciting research area\cite{1}\cite{2}\cite{3}\cite{4}. Very recently, a collinear antiferromagnetic spin order was found to induce a ferroelectric polarization in a highly symmetric cubic perovskite LaMn\textsubscript{3}Cr\textsubscript{4}O\textsubscript{12} \cite{5}. This spin-driven ferroelectricity could not be explained by any of the existing multiferroic models\cite{6}\cite{7}\cite{8}\cite{9}\cite{10}\cite{11}. Here, we put forward a new model, i.e., anisotropic symmetric exchange, to understand this phenomenon, which was confirmed by density functional calculations and tight-binding simulations. Furthermore, our perturbation analysis shows that the anisotropic symmetric exchange term can be even stronger than the conventional contributions in some 5d systems. Our multiferroic model can not only explain the experimental results, but also may open a new avenue for exploring exotic magnetoelectric coupling effects.

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