

Abstract Submitted
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Symmetry based approaches to discovering new improper ferroelectrics / multiferroics¹ JOHN CLARIDGE, MATTHEW DYER, MATTHEW ROSSEINSKY, University of Liverpool — The area of improper ferroelectrics and potentially multiferroics has recently received significant attention do the prediction that a combination of $a^-a^-c^+$ tilting and layered ordering of the A site cations along $[001]_{\text{perov}}$ in perovskite ABX_3 systems, leads to non-centrosymmetric structures which are predicted to have significant switchable polarisations. Here we elaborate a superspace description of cation ordering in tilted perovskites that allows the prediction of the symmetry of arbitrary cation ordered superlattices, along $\langle 100 \rangle_{\text{perov}}$, $\langle 110 \rangle_{\text{perov}}$ and $\langle 111 \rangle_{\text{perov}}$ and ordering of both A and B cations, of the various tilted perovskites, which also rationalizes the observed domain structures. This approach is expanded to include magnetic symmetry and the potential for finding other suitable structural distortions in different systems will be discussed.

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