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Surface magnetization of a multiferroic with linear \mathbf{M} -to- \mathbf{P} coupling: The case of FeTiO_3 JAMES GLASBRENNER, KIRILL BELASHCHENKO, University of Nebraska-Lincoln — A multiferroic material with linear coupling between the magnetization \mathbf{M} and electric polarization \mathbf{P} could serve as an electric switch of magnetization. However, for applications it is necessary to couple its magnetization to a proximate ferromagnet through exchange bias at the interface. Symmetry considerations indicate that multiferroics with linear \mathbf{M} -to- \mathbf{P} coupling should also have a boundary magnetization, which is not directly coupled to \mathbf{P} but is rather determined by the surface normal direction. This magnetization can present an obstacle for electric switching of exchange bias. Here we investigate the (001) surface magnetization of LiNbO_3 -type FeTiO_3 using first-principles PAW calculations with spin-orbit coupling. The surface magnetization appears through spin canting of the surface moments. This canting is found for different surface terminations and compared with the bulk behavior.

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