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**Search for Multi-Ferroic Manganites with Elongated Mn-O bonds** BOGDAN DABROWSKI, JAMES MAIS, STANISLAW KOLESNIK, Department of Physics, Northern Illinois University, DeKalb, IL — Development of multi-ferroic materials, where magnetism and ferroelectricity are strongly coupled near room temperature, is of fundamental technological and theoretical importance. Typically, both phenomena tend to be mutually exclusive because ferroelectricity is usually present for $d^0$ and magnetism for non-$d^0$ transition metals. By analogy to perovskite $Ba^{2+}Ti^{4+}O_3$ ($d^0$) for which [Ti-O] bonds are highly elongated beyond their equilibrium lengths resulting in Ti distortion out of the center of the $TiO_6$ octahedral unit, resulting in $T_F$ ~400 K ferroelectricity, we have projected that similar effect should be observed for the non-$d^0$ insulating and antiferromagnetic ($T_N$ ~240 K) perovskites of $Mn^{4+}$ ($d^3$). I will describe our search for such compounds guided by our "tolerance factor design rules" in the (Sr,Ba)Mn $O_3$ system for which strong multi-ferroic behavior was achieved near room temperature.

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