Ferroelectricity in frustrated magnets with spiral ordering

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In recently discovered multiferroics RMnO$_3$ (R = Tb, Dy, Gd), RMn$_2$O$_5$ (R = Tb, Ho, Dy), and Ni$_3$V$_2$O$_8$ the electrical polarization is induced by an incommensurate magnetic ordering, which gives rise to a strong interplay between ferroelectricity and magnetism. I will discuss a microscopic mechanism of the spontaneous polarization in these magnetic ferroelectrics and present a simple phenomenological theory, which explains their main properties. In particular, I will discuss the orientation of the electrical polarization vector in spin-density-wave states and domain walls, the small temperature shift between the ferroelectric and first magnetic transition, the dielectric susceptibility anomalies, and the dependence of the electrical polarization on magnetic field.