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Ferroelectricity in frustrated magnets[1]

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The coupling between ferroelectricity and magnetism in multiferroics is a complex many-body phenomenon resulting from the interplay between charge, spin, and lattice degrees of freedom, and interesting both for its fundamental physics and possible technological applications. An exceptionally strong sensitivity of ferroelectric ordering to an applied magnetic field was recently found in a number of frustrated magnets with periodic non-collinear spin structures. In this talk I will present a phenomenological approach to ferroelectric magnets, which explains the relation between electric polarization and magnetic ordering, anomalies in dielectric constant at magnetic transitions, and sudden flops of electric polarization in magnetic field, observed in these materials. I will also discuss microscopic mechanisms that can give rise to ferroelectricity in magnetically ordered states and possible roads to high- temperature multiferroics.

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