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Probing multiferroicity and spin-spin interactions via angular dependent dielectric measurements on Y-doped $HoMnO_3$ in high magnetic fields[1] RELJA VASIC, HAIDONG ZHOU, CHRIS WIEBE, JAMES BROOKS, FSU/NHMFL — Dielectric measurements are used to characterize magnetic phase transitions in the doped ferrielectric oxides $Ho_{1-x}Y_xMnO_3$ ($x = 0$, 0.4, 0.5, 0.6, 0.7, 0.8, 1). The T-B-θ phase diagram of the ferrielectric material $Ho_{1-x}Y_xMnO_3$ has been determined from the dielectric constant angular dependence between the crystallographic c-axis and applied magnetic field. The re-entrant temperature-magnetic field phase transitions which involve in- plane Mn spin rotations in the antiferromagnetic state below the Néel temperature are driven by the interaction with the Ho subsystem. We describe this behavior in terms of the interaction of the Ho sublattice spin system with the underlying, robust $YMnO_3$ antiferromagnetic triangular lattice, where the Ho-spin interactions are highly sensitive to Y concentration and field direction. The magnetic field anisotropy study is an important step towards understanding of magnetic and electric phase competition in the diluted $4f$ system by non-magnetic Yttrium(Y).

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