

Changes of spin dynamics in multiferroic $\text{Tb}_{1-x}\text{Ca}_x\text{MnO}_3$

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In most multiferroics, the onset of ferroelectricity occurs at much higher temperature than magnetic ordering temperature, and the two are usually weakly coupled. Recently, a new class of multiferroics have been discovered, where magnetic ordering induces ferroelectricity. Among these new material are distorted rare-earth manganites RMnO_3 , with $\text{R}=\text{Gd}$, Tb and Dy , in which the ferroelectricity is thought to be induced by the existence of a magnetic spiral structure [1]

We report a series of μSR measurements performed on polycrystalline and single crystalline $\text{Tb}_{1-x}\text{Ca}_x\text{MnO}_3$, with $x=0$, 0.05 and 0.1 . We find that the spin relaxation rate depends strongly on the Ca doping concentrations. It is also affected by the change of magnetic spiral structure which correlates with the variation of dielectric constant and electric polarization.

[1] M. Kenzelmann et al. , Phys. Rev. Lett. 95 (205) 087206.