

Local Probe Studies on Highly Distorted Rare-Earth Manganites

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The perovskite manganites of the family RMnO_3 ($\text{R}=\text{Eu, Gd, Ho, Y, Er and Lu}$) show different competing orders, e.g. orbital, magnetic, and dielectric, that lead to intriguing properties as colossal magnetoresistance and multiferroic behaviour.

Looking forward to investigate locally the interplay between structural, electric and magnetic degrees of freedom, samples have been synthesized via sol-gel methods and studied with the Perturbed Angular Correlation (PAC) technique.

In this first work we have limited the use of PAC to measure the Electric Field Gradient (EFG) / Magnetic Hyperfine Field (MHF) in a series of samples with different rare-earths (R), aiming to find a correlation between these local parameters and the ionic radius of the R element.

At ISOLDE small pellets were implanted with ^{111}mCd and subsequently annealed to remove implantation defects. The PAC measurements have been performed from 10K up to 473K for the same samples. These results are compared with the ones previously obtained for other perovskite manganites like LaMnO_3 , PrMnO_3 and CaMnO_3 . Complementary information is obtained through X-ray diffraction data and SQUID measurements on the same samples. The unit-cell parameters, the bond distances and angles are also factors that can be related to the effects under study, and their revision is also proposed in order to complete the microscopic characterization of these compounds.

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