

Local Ordering of Oxygen in High-Tc Superconductors

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Lattice sites and collective ordering of highly oxygen doped samples of $\text{HgBa}_2\text{Can-1CuO}_{2n+2+\delta}$ ($n=2, 3$, Hg-1212 and Hg-1223) were investigated using the Perturbed Angular Correlation (PAC) technique by measuring the electric field gradients at 199mHg nuclei. The experiments in these compounds were performed at different annealing conditions, under Ar flow or O_2 pressure up to 152 bars. In comparison with the data and calculations already published for the fluorine doping in Hg-1201 ($n=1$) [1], the preliminary analysis hints that at high concentrations oxygen atoms order in different way, other than the atomic-like stripes found for fluorine. In addition, these experiments have been performed at different temperatures, above and below the superconducting transition, which have revealed further differences in the charge distribution of the Hg surroundings.

A full set of PAC, magnetic and X-ray diffraction data has been obtained that is now being analyzed to be further compared to first principle calculations of charge density in these materials obtained for different oxygen configurations.

[1] J. G. Correia, H. Haas, V. S. Amaral, A. M. L. Lopes, J. P. Araújo, S. Le Floch, P. Bordet, E. Rita, J. C. Soares, W. Troger and the ISOLDE collaboration, *Physical Rev. B* 72 (2005) 1.

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