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Local charge density and its variation in cuprate superconductors from NMR MICHAEL JURKUTAT, STEVEN REICHARDT, University of Leipzig, Germany, ANDREAS ERB, Walther Meissner Institute for Low Temperature Research, Garching, Germany, JUERGEN HAASE, University of Leipzig, Germany — It was shown that NMR provides a quantitative measure of local charge at Cu and O in the CuO_2 plane of cuprate superconductors. A phase diagram in terms of these local charges, rather than total doping, reveals unsuspected insight into material-specific differences, while providing a unifying view of all cuprates. It is the sharing of the inherent Cu hole with O, which is intimately linked with the charge transfer gap and which determines the maximum Tc and superfluid density. Thus, one has a material chemistry parameter measurable even at room temperature with NMR that sets superconducting properties. Based on these findings, combined with new insight from high-pressure NMR data it is shown that these local charges vary spatially in the CuO_2 plane. In fact, it will be argued that charge density variations in the cuprates are ubiquitous.

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