Electron Densities in Prototypic Antiferromagnets from Gamma-Ray Diffraction, W. Jauch, *Hahn-Meitner-Institut, Glienicker Str. 100, D-14109 Berlin (Germany)*

Keywords: Gamma-Ray Diffraction; Electron Density; Transition metal compounds

With the use of a photon energy above 300 keV, the high-energy diffraction case is fully realized, and a structure factor accuracy of 0.1% is achievable. Gamma-ray diffraction is especially suited for the study of simple inorganic solids with heavier elements, which demand more than usual data accuracy due to the dominance of the core-electron scattering. Prototypic antiferromagnets including the late 3*d* transition-metal monoxides and difluorides have been systematically investigated, both in the paramagnetic and the fully ordered phase. Domain formation, arising from a lowering of crystal symmetry, has been suppressed by application of uniaxial pressure. From the experimental model electron density quantitative information is accessible on magnetic ground state properties such as crystal field effects, spin delocalization, spatial extent of *d*-electrons, spin-orbit coupling, orbital-to-spin angular momentum ratios, etc. Comparisons are made between analyses based on modern neutron and x-ray magnetic measurements providing a stringent validation of results.