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Resonant soft x-ray diffraction from Fe_3O_4/MgO below the Verwey transition C. SCHUESSLER-LANGEHEINE, J. SCHLAPPA, C. F. CHANG, H. OTT, Z. HU, L. H. TJENG, II. Physikalisches Institut, Universitaet zu Koeln, Germany, E. SCHIERLE, E. WESCHKE, G. KAINDL, Institut fuer Experimentalphysik, Freie Universitaet Berlin, Germany, A. TANAKA, ADSM, Hiroshima University, Japan — The electronic structure of the low-temperature phase of magnetite (Fe_3O_4) has been studied for more than 60 years. In particular the question whether or to which extend the low-temperature phase is characterized by a charge order on the octahedral Fe-sites is controversially discussed. We studied this system using resonant soft x-ray diffraction at the Fe $L_{2,3}$ resonance, a technique particularly sensitive to spatial modulations of the electronic state. The resonance behaviour of the (001) peak, which is characteristic for the low temperature phase, is distinctly different from that of the also studied (001/2) diffraction peak; we assign the (001) peak to charge order with a modulation of about 16 percent of a unit charge, while the (001/2) peak is caused by a different order involving only Fe^{2+} sites in octahedral environment.

Christian Schuessler-Langeheine
II. Physikalisches Institut, Universitaet zu Koeln, Germany

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