

Abstract Submitted
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Charge-ordering in Magnetite studied by Magnetic Compton scattering B. BARBIELLINI, Northeastern U. (NU), H. KOBAYASHI, University of Hyogo & JASRI (SPring-8), Japan, M. ITOU, JASRI (SPring-8), Japan, S. TODO, The University of Tokyo, Chiba, Japan, P.E. MIJNARENDS, Delft U. of Tech. & NU, A. BANSIL, NU — We present the [100]-[110] anisotropy of the magnetic Compton profile (MCP) in magnetite (Fe_3O_4). Good agreement is found between theory (within the local spin density approximation) and experiment with respect to the anisotropy in the metallic phase at 300K. However, the experimental curve for the insulating phase at 12K presents important changes at the low-momentum peak near 1 a.u. indicating that the bonding electrons are significantly affected by the Verwey transition. We will discuss whether these MCP anisotropy changes can be explained in terms of a charge-ordering mitigated by covalent effects [1]. Our study illustrates the high sensitivity of the Magnetic Compton scattering technique for extracting information on the electrons involved in the Verwey transition. Work supported in part by U.S. DOE.
[1] M. Coey, Nature **430**, 155 (2004)

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