

Abstract Submitted
for the MAR06 Meeting of
The American Physical Society

Spectroscopy of stripe order in $\text{La}_{1.8}\text{Sr}_{0.2}\text{NiO}_4$ using resonant soft x-ray diffraction J. SCHLAPPA, C. SCHUESSLER-LANGEHEINE, Z. HU, C. F. CHANG, M. BENOMAR, H. OTT, O. FRIEDT, M. BRADEN, L.H. TJENG, II. Physikalisches Institut, Universitaet zu Koeln, Germany, A. TANAKA, ADSM, Hiroshima University, Japan, E. SCHIERLE, E. WESCHKE, G. KAINDL, Institut fuer Experimentalphysik, Freie Universitaet Berlin, Germany, G.A. SAWATZKY, Department of Physics and Astronomy, UBC, Canada, H.-J. LIN, C.T. CHEN, NSRRC, Hsinchu, Taiwan — We studied the electronic structure and temperature dependence of the stripe phase in Sr-doped La_2NiO_4 using resonant diffraction at the Ni $L_{2,3}$ and La $M_{4,5}$ edge in combination with a realistic microscopic theory. Making use of the very high sensitivity of the method to ordered modulations of the electronic state, we found the doped holes to be mainly located on the oxygen ligands in the NiO_2 planes, each centered around one Ni ion. The Ni ions in the hole-rich stripes are essentially in a high-spin d^8 state and the hole spin is coupled antiparallel to the Ni spin in close analogy to the Zhang-Rice singlet state in cuprates. Such an understanding of the charge-ordered phase could not be obtained before, neither by conventional x-ray or neutron diffraction techniques, nor by x-ray absorption spectroscopy.

Justina Schlappa
II. Physikalisches Institut, Universitaet zu Koeln, Germany

Date submitted: 04 Dec 2005

Electronic form version 1.4