X	**Experiment title:** Charge and structural order parameters and correlated polarons at the metal-insulator transition in $NdNiO_3$ epitaxial films.	**Experiment number**: HE-1391
Beamline: ID 20	**Date of experiment**: from: 04/09/2002 to: 10/09/2002	**Date of report**: 20/02/2004
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Electronic charge localization in 3d transition-metal oxides has attracted considerable interest in the past. These localization phenomena, which lead to metal-insulator transitions, play a crucial role in such materials as high-T_c cuprates and giant magneto-resistive manganites. Recently we have found a charge disproportionation phenomena in $NdNiO_3$, which occurs below the metal-insulatator [1]. The simultaneous precence of orbital-ordering with this phenomena is under debate.

In order to investigate the presence of orbital-ordering in the insulating phase, we have collected data on the azimuthal behavior (rotation about the wave vector) of particular reflections on a $NdNiO_3$ [011] thin film.
On and off resonance spectra were collected for the high and low temperature phases in both □□□ and □□□ polarization channels. The experimental behavior has been compared with the theoretical one, calculated with the use of the tensor $<T_Q^K>$ which takes into account the contribution of the anisotropy of the atomic scattering factor close to the absorption edges. K is the rank of the tensor (K=0 is for charge, K=1 is for magnetic and K=2 is for orbital contributions). In the case of $NdNiO_3$ (*Pbnm* space group for the high temperature phase), for forbidden reflection like (0 2n+1 l) i.e. (0 3 3), only the tensor of rank 2 is contributing with Q=0, ±1 (i.e. T_1^2).

A more detailed explanation can be found in reference [2, 3].

No azimuthal dependence was founded, as expected, in the □□□ channel.

In the case of the □□□ channel there is good agreement between theory and measured integrated intensity (see fig.1).

A similar azimuthal behavior was found in the low temperature phase ($T<T_{MI}$), see fig.2.

Those results suggest that the orbital-ordering is not present or doesn't play any role in determining the charge orderining at metal-insulator transition.

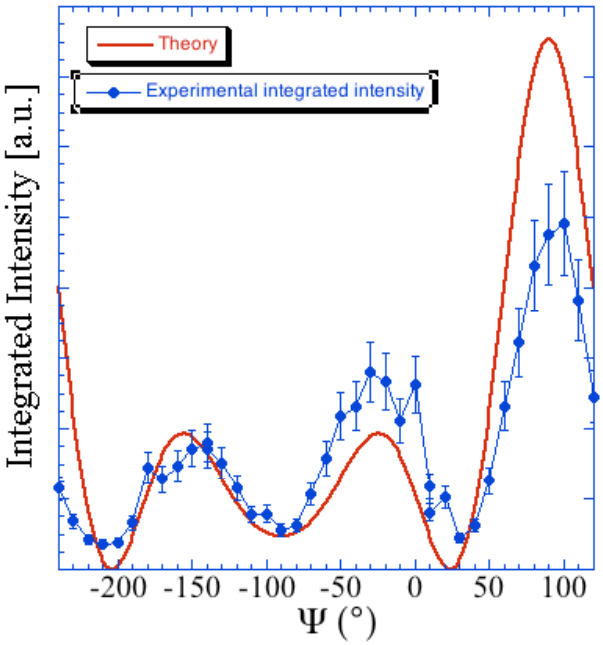

Fig.1 Experimental behavior of the (033) reflection, in the □□□ channel as a function of the azimuthal angle □ (dotted line) compared with theoretical behavior (continuous line).

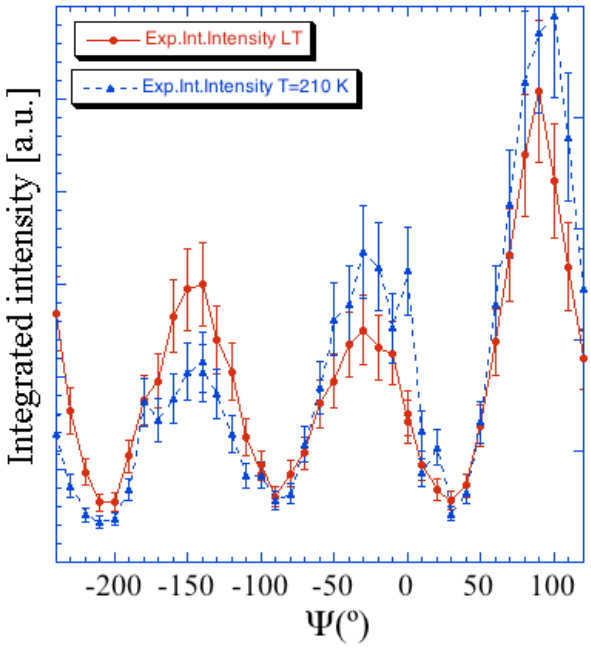

Fig.2 Azimuthal angle dependence of the (033) reflection in the □□□ channel for the low temperature phase (dotted line) and the high temperature one (continuous line).

[1] U. Staub *et al.* Phys. Rew. Lett. 88, 126402 (2002)

[2] U. Staub *et al.* Physica B 345,23 (2004)

[3] V. Scagnoli *et al.* Jour of Magn. and Mag. Mat., in press