Abstract Submitted
for the MAR14 Meeting of
The American Physical Society

Electronic properties of nickelates across the metal-insulator transition: a high-resolution ARPES study R.S. DHAKA, Z. RISTIC, PSI and EPFL, N.C. PLUMB, PSI, W. KONG, PSI, Switzerland and IOP, Beijing, M. MEDARDE, M. SHI, L. PATTHEY, M. RADOVIC, PSI, J. MESOT, PSI and EPFL, Switzerland — The metal-insulator transition (MIT) in rare earth nickelate thin films has started to be a focus of the research in condensed matter physics [1]. Transport, magnetization and neutron scattering studies have shown a temperature driven MIT and magnetism in strongly correlated RNiO3 bulk samples [2] as well as in thin films [1]. In these systems it is believed that strong electron-electron correlations play an important role in MIT phenomena [3]. However, no direct information of the momentum resolved electronic structure across the MIT has been provided so far. Here, by combining in-situ PLD and high-resolution angle-resolved photoemission study, we report the band structure and Fermi surface (FS) of NdNiO3 thin films across the temperature driven MIT. In the metallic phase, we prove the existence of electron and hole FS pockets at the center and corner of the Brillouin zone (BZ), respectively. These FS pockets show strongly three-dimensional nature along the c-axis. Upon cooling across the MIT, we observe transfer of the spectral weight from near the Fermi level to higher binding energy in the entire BZ. Our results demonstrate the loss of coherent quasiparticle spectral weight associated with strong electron correlations involved in the MIT. [1] J. Liu et al., Nature Comm 4, 2714 (2013); R. Scherwitzl, et al., Advanced Materials 22, 5517 (2010). [2] M. Medarde, JPCM 9, 1679 (1997). [3] M. Imada, et al., Rev. Mod. Phys. 70, 1039 (1998).

Rajendra S. Dhaka
Paul Scherrer Inst

Date submitted: 15 Nov 2013 Electronic form version 1.4