Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electronic structure of two dimensional electron gases at the (111) - surface of $KTaO_3$ and $SrTiO_3$[1] FLAVIO BRUNO, S. MCKEOWN WALKER, A. DE LA TORRE, S. RICCO, A. TAMAI, University of Geneva (Switzerland), Z. WANG, M. SHI, Swiss Light Source, PSI (Switzerland), T. K. KIM, M. HOESCH, Diamond Light Source (United Kingdom), M.S. BAHRAMY, University of Tokyo (Japan), P. D. C. KING, University of St Andrews (United Kingdom), F. BAUMBERGER, University of Geneva (Switzerland) — Doping the band insulators $KTaO_3$ (KTO) and $SrTiO_3$ (STO) by chemical substitution or by the creation of oxygen defects induces metallicity and even superconductivity at exceptionally low carrier densities. A promising strongly correlated model system emerged when it was discovered that a 2D electron gas (2DEG) can be stabilized in KTO by field effect, and in STO by interfacing with other oxides. These materials also support a similar 2DEG formed by an electron accumulation layer screening positively charged oxygen vacancy defects that are created in the surface by irradiating the samples with photons of appropriate energy. [Adv. Mat. 27, 3894 (2015)] Here, we will report on direct measurements of the 2DEG band structure stabilized on the (111) – surface of KTO and STO using high resolution angle-resolved photoemission (ARPES) [Phys. Rev. Lett. 113, 177601 (2014)]. The differences and similarities between the electronic structure of these two systems in terms of the strong and weak spin orbit coupling found in KTO and STO respectively will be discussed.

[1]FYB acknowledge support from the Swiss National Science Foundation (Ambizione Grant PZ00P2_161327/1)

Flavio Bruno
University of Geneva (Switzerland)

Date submitted: 29 Oct 2015 Electronic form version 1.4