

Electronic structure of all-oxides heterojunctions probed by photoemission spectroscopies

Giovanni Drera

I-LAMP and Dipartimento di Matematica e Fisica, Università Cattolica sede di Brescia, Italy
(giovanni.drera@unicatt.it)

Recent advances in the growth of epitaxial oxide thin films have fostered a steady increase of research on perovskite oxide heterojunctions, which are now produced with unprecedented quality. Often, these materials display several unexpected magnetic, transport and correlation-related properties. Photoemission spectroscopies are now playing a key role in the investigation of electronic and structural properties of all-oxide heterointerfaces¹⁻⁴; In particular, the spectral weight enhancement (Resonant photoemission and ARPES) obtained by tuning the photon energy⁵ across selected absorption edges has disclosed unexpected possibilities in the study of band dispersion at buried interfaces.

In this talk, I will first show a brief survey of several photoelectron spectroscopies results on defective $\text{SrTiO}_{3-\delta}$ and on the $\text{LaAlO}_3\text{-SrTiO}_3$ seminal case. Then, the discussion will be extended to other interesting oxides grown on $\text{SrTiO}_3(001)$, with both perovskite (BiFeO_3 , LaCrO_3) and non-perovskite (CuO , Al_2O_3) crystal structure. For each case the junction band diagram obtained with XPS will be discussed in detail, as it provides fundamental understanding on the charge doping level and ultimately on the possible real-world applications.

References

- [1] A. Giampietri, G. Drera, L. Sangaletti, *Adv. Mat. Int.*, **4** (2017) 1700144.
- [2] G. Drera, G. Salvinelli, A Brinkman, et al. *Phys. Rev. B* **87** (2013) 075435.
- [3] A. Giampietri, G Drera, I. Pis, E. Magnano, L. Sangaletti, *Appl. Phys. Lett.* **109** (2016) 132903.
- [4] G. Drera, G. Salvinelli, F. Bondino, et al., *Phys. Rev. B* **90** (2014) 035124.
- [5] G. Drera, F. Banfi, F.F. Canova, P. Borghetti, L Sangaletti, et al., *Appl. Phys. Lett.* **98** (2011), 052907.