

# ***High-resolution ARPES for the study of correlated-electron materials***

***Andrés F. Santander-Syro***

**CSNSM – Université Paris-Sud**

Angle-resolved photoemission spectroscopy (ARPES) is a powerful technique to study the microscopic properties of solids. ARPES gives direct access to the band structure of a material, and provides valuable information about the many-body interactions affecting such band structure.

On the other hand, many interesting, and even open, problems in modern condensed-matter physics involve low electronic energy scales, of the order of a few meV, and temperatures of a few Kelvin. The experimental study of the electronic structure of these systems is best realized using (ultra-) high resolution ARPES at very low temperatures.

These lectures will introduce the basic aspects of high-resolution ARPES, from a synopsis of currently used instrumentation to its application in the study of various fascinating problems of correlated-electron systems. Time permitting, topics to be discussed include:

- Basic aspects of ARPES: measurement and instrumentation
- Brief overview of many-body effects and how to study them using ARPES.
- Electron-phonon coupling (and similar electron-boson couplings).
- Quasi-1D systems.
- Low- and high-TC superconductors.
- Kondo resonance and periodic Anderson lattice.
- Effects of spin-orbit coupling on the electronic structure.