

Synchrotrons provide several techniques that can potentially give important information about multifunctional materials. In this talk we will concentrate on the soft X-rays range, showing how they can be used to understand the structural, chemical, magnetic and even the dielectric properties of materials. We will focus mostly on heterostructures and multiferroic systems, showing that with a proper choice of the polarization of the X-rays and of the experimental geometry, one can disentangle the magnetic and ferroelectric information of these materials. In this sense, we will discuss the use of X-ray dichroism, using either circular or linear polarization, to investigate both the structural and magnetic properties samples presenting more than one ferroic order. We will show examples of information obtained with standard X-ray absorption, as well with submicrometric spatial resolution using photoemission electron microscopy (PEEM).