Synchrotron light: opportunities for physics, chemistry and materials science

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In-situ or operando synchrotron X-ray techniques are currently used to understand the fundamental mechanism and guide not only the materials design protocols but the technological optimization as well, in all classes of functional materials.
The merits of synchrotron X-rays, like high brightness (10^{12} times more intense than laboratory sources), collimation and energy tunability, make them ideal for diverse applications to study materials from semiconductors and ion conductors, to magnetism, catalysis, optoelectronics, etc. The synchrotron beam allows the implementation of sophisticated techniques involving high temporal resolution (down to milliseconds) of physicochemical processes.
In this seminar, after a brief introduction highlighting the EBS upgrade at ESRF, exemplifying case studies will be discussed, involving combined information from X-ray diffraction, X-ray Raman scattering, X-ray absorption with the use of microbeams: *in situ* and *operando* investigations of electrocatalytical systems, and fundamental studies of materials for energy storage and conversion.