

From the Model System to the Application: How ALBA Supports Science & Innovation

By Klaus Attenkofer
ALBA

Over the first decade of operation, ALBA had positioned itself in the league of world-wide leading facilities with a wide range of morphology, crystallographic and disordered structure, and magnetic and electronic structure probes, serving a wide natural science community. Besides bulk and surface probes, ALBA staff, in collaboration with the user community, has also developed and perfectionated imaging probes elucidating chemical, electrical and magnetic properties including tomographic techniques of thin films and 3D structures.

Based on this underpinning, the current upgrade of ALBA to a 4th generation light source is pushing the required sample size for spectroscopic and scattering techniques to the micrometer and sub-micrometer level and allows to strengthen imaging capabilities by optimizing existing instruments and adding coherent based techniques. The upgrade of the existing beamlines in combination with three new beamlines, to be operational after the one-year shutdown in 2032, is also adding high throughput and data analytics capabilities to the user program. Combined with enhanced operando and in-situ capabilities, ALBA is adding to the standard user program a high-resolution Transmission Electron Microscopy as well as a Scanning Surface Microscopy platform.

To give our users the full benefit of this optimized suite of instrumentation, ALBA currently develops multimodal workflows for target areas, providing the user with methodologies to reach the research goals in shorter time and in systems with increased complexity and inhomogeneity, largely benefitting the connection between basic science and innovation.

The talk will summarize ALBA's strategy and underlines this with examples from spintronics and magnonics and its correlation to beyond-CMOS electronics. A central part will be the development of multimodal workflows and the use of data analytics as well as the development of new access modes.