

COMPLEX OXIDE THIN FILMS AND HETEROSTRUCTURES-SCIENTIFIC OPPORTUNITIES-TECHNOLOGICAL CHALLENGES

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Mastering the technological challenges in semiconductor thin film physics has been the baseline for the microelectronic revolution in the second half of the last century. Similarly, complex oxides with strong electron correlation, characterized by their plethora of functionalities - ranging from superconductivity to ferromagnetism - are expected to play a similar role in electronics in this century.

In my talk I will give a survey of the physics of complex oxides with strong electron correlation and the relevant thin film technologies required for device fabrication. As a case study for novel physics emerging from the technological mastering of complex oxide thin film technology an analysis of the mutual interaction of superconducting and ferromagnetic nanoscale heterostructures and superlattices is presented. Special emphasis is given to advanced diagnostic techniques probing the electronic properties at the interfaces of heterostructures and superlattices.

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