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NanoARPES and Electronic Imaging: A Cutting-Edge tool to Direct Electronic Structure determination of nanomaterials

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Angle-Resolved Photoemission Spectroscopy (ARPES) has emerged as a foundational technique in the study of advanced materials due to its unique capability to directly probe electronic structures within momentum space. The complex physics underlying these materials is profoundly influenced by many-body interactions and electronic confinement, shaped by concepts such as symmetry and topology that have revolutionized our understanding of matter. ARPES has played a pivotal role in the discovery and characterization of materials exhibiting strongly correlated electronic states and nontrivial topological properties. Over the past two decades, ARPES has seen remarkable advancements in angular, spatial, temporal, and spin resolution. These technical innovations, coupled with novel material synthesis methods, have paved new avenues for exploring and manipulating nanomaterials. This presentation reviews the latest developments in ARPES, with a particular focus on NanoARPES, highlighting scientific breakthroughs¹⁻⁶ enabled by these advancements and emphasizing the critical role of this technique in modern methods for electronic structure calculations.

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