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Frontiers in Nano-ARPES research at the ALS MAESTRO beamline and outlook towards ALS-U

Wednesday 28 August 2024 16:55 (20 minutes)

Angle-Resolved Photoemission Spectroscopy (ARPES) is the premier tool to determine a quantum material's momentum-dependent electronic states and their energy and lifetime renormalization due to many-body interactions. Nanoscale ARPES (nanoARPES) has recently greatly expanded the practical reach of ARPES to submicron samples. The MAESTRO nanoARPES instrument at the ALS has achieves ~100 nm resolution and has opened the door to a rapidly growing user community. I will give a brief review of the status and recent work of the nanoARPES program at the ALS and then discuss the future of the program, highlighting the importance of the ALS-U upgrade. Finally, I will introduce a novel approach to push nanoARPES resolution beyond today's practical limits to a fundamentally new regime, 10 nm and below. This ultimate nanoARPES could open a new frontier for understanding interactions and the electronic structure origin of emergent properties at the length scales where they develop.

I plan to submit also conference proceedings

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