

MAESTRO: A New Facility for Characterization of Many-Body Physics Using nm-scale ARPES

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Angle-resolved photoemission spectroscopy (ARPES) is the premier technique for determining the momentum-resolved electronic structure of complex materials. Over the last 15 years, the advent of efficient detection schemes has improved the momentum and energy resolution by an order of magnitude. This has allowed us to study fundamental processes such as superconductivity that result from low-energy, many-body interactions.

I will review ARPES experiments conducted at the ALS on in situ grown materials (metals, graphene, and oxides), in which we determine the single particle spectral function. This function encodes many-body interactions such as electron-phonon, -electron, -magnon, and -plasmon scattering. I will also discuss progress towards the development of a new, dedicated beamline for spatially resolved ARPES. We plan for a 1000-fold improvement of spatial resolution so that we can address the important problem of spatial fluctuations in correlated materials.

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