

Shining a light on High Tc Superconductivity in the Iron Age

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Photoemission has developed into a powerful probe of condensed matter. Modern technical developments enable the study of not only the single particle spectra but also the interaction with collective excitations. In this talk we present an overview of the modern photoemission experiment with demonstrations of its application to the high Tc superconductors. In particular we focus on studies of the more recently discovered Fe-based superconductors using not only synchrotron radiation but also lasers as the photon source; the latter allowing very high energy and momentum resolution of the electronic structure. A recent and powerful development in condensed matter physics has been the realization of the role of topology. The two fields, topology and superconductivity, have collided in the Fe based superconductors with the recent identification of topological states at the center of the zone in the Fe-chalcogenide family, $\text{FeTe}_{1-x}\text{Se}_x$. Laser based photoemission studies of the topological states appear to indicate time reversal symmetry breaking at the superconducting transition. We discuss these observations and what they may imply for surface superconductivity and the superconducting order parameter in the Fe-based superconductors.