

ARPES and the role of electron –boson interactions

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It is impossible to over emphasize the important role played by electron –boson interactions in determining the physical properties of quantum materials and especially the strongly correlated transition metal compounds. The electron phonon interactions drive all kinds of phase transitions including those to the superconducting state in conventional superconductors. The transport of charge and spin in solids like the manganites and cobaltates are determined by very strong tendencies towards polaron and perhaps even bipolaron formation resulting in large effective masses. In addition the strong influence of orbital and magnetic ordering on the transport properties demonstrates the importance of electron magnon and electron orbiton interactions, Angular resolved photoelectron spectroscopy is one of the most direct methods to study such electron boson interactions and since they not only strongly influence the quasi particle dispersion relations but also dictate the details of the complex line shapes.

In this talk I will review some of the important aspects of electron boson coupling in correlated electron systems with special emphasis on the high T_c 's, the Manganites and Cobaltates. I will demonstrate the strong influence of electron boson coupling on ARPES and how this can be used to provide information on the importance of such a coupling.