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Extracting surface phonon properties from the electronic spectral function

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Angle resolved photoemission measurements have revealed an enhancement in the electron-phonon coupling (EPC) for two-dimensional surface states and quantum-well states in thin films. A recent theoretical advancement by J. Shi [1] has developed a method for the direct extraction of the momentum dependent Eliashberg function from the high-resolution photoemission data. The origin of the enhanced EPC at surfaces and interfaces will be explored as well as schemes to tune the EPC by modification of the surface electronic and vibrational properties. The implications of EPC on physical properties will be discussed, including the lifetime of electronic states near the Fermi energy.

1. Junren Shi et al., Phys. Rev. Lett. 92, 186401 (2004).

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