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Phenomenological model for extracting local energy scales across dopings and temperatures in cuprates[1] KYLE MCELROY, EDUARDO CALLEJA, JIXIA DAI, University of Colorado Boulder, GENDA GU, Brookhaven National Laboratory, JACOB ALLDREDGE, National Institute of Standards and Technology Boulder — One of the key questions that remains unanswered in the cuprate high temperature superconductors is the nature of the pesudogap phase that exists above the superconducting transition temperature in underdoped materials. In order to differentiate the different proposed origins of this phase, a detailed phenomenology of the different energy scales that characterize it and the superconducting phase is required. In addition, many of these materials (BSCCO-2212 in particular) have shown striking inhomogeneity that further complicates observations of these scales. Spectroscopic imaging scanning tunneling microscopy has the unique ability to resolve density of states features with the needed spatial resolution for seeing through this inhomogeneity. We will present a new phenomenological model for extracting three different energy scales that are present with atomic resolution across several dopings. In addition, preliminary data on the temperature dependence of these scales will be shown. Lastly, how these different scales relate to the different phases present in the underdoped cuprates will be discussed.

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