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Exploring the Nature of the Electronic Scatters in $\mathbf{Bi_2Sr_2CaCu_2O_{8+\delta}}$ EDUARDO CALLEJA, JIXIA DAI, University of Colorado at Boulder, GENDA GU, Brookhaven National Laboratory, KYLE MCELROY, University of Colorado at Boulder — The superconducting cuprates have been one of the most studied classes of materials over the last 20 years. While much progress has been made in understanding the strange electronic properties which govern their rich phase diagram, the interplay between coulomb interactions (which are thought to play a key role in their unconventional superconductivity) and the corresponding quasi particle scattering caused by coulomb interactions, are still the subject of debate among the community. We attempt to explore this issue by using spectroscopic imaging scanning tunneling spectroscopy (SI-STS) at variable temperatures which allows us to probe the Local Density of States (LDOS). The LDOS can be fitted with the theorized Dynes' formula allowing for the extraction of the quasi particle scattering rates. Furthermore, we seek to understand the scattering process by simulating the patterns produced by quasi particle interference (QPI) by either a pair potential impurity or a non-magnetic impurity. Extraction of these rates at various dopings and temperatures in the phase diagram will be presented.

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