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The role of the Z-map in observations of quasiparticle interference in the cuprates ELIZABETH NOWADNICK, BRIAN MORITZ, THOMAS DEVEREAUX, Stanford University and SLAC — Scanning tunneling spectroscopy (STS) measurements have observed that the local density of states in the cuprates is spatially inhomogeneous. When the Fourier transform of the STS data is computed, this modulation shows up as a set of peaks in the momentum space density of states. The modulation can be understood as arising from quasiparticle interference, where the scattering of quasiparticles from impurities mixes the momentum space eigenstates. Researchers have recently found that the quasiparticle interference pattern in the Fourier transform density of states is enhanced if the Z-map, defined as the ratio of the density of states at positive and negative bias, is examined, rather than the density of states itself. To investigate the reasons for this enhancement, we present calculations of momentum dependent quasiparticle scattering from impurities. Using a self-consistent T-matrix formalism, we model impurities as regions of the lattice that modulate the hopping, superconducting gap, and site energy parameters. By varying the impurity size, shape, and modulation parameters in our calculation, we perform a systematic study of the effect of the Z-map on the quasiparticle interference signal.

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