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Investigating the Effects of Doping Inhomogeneity on the ARPES Spectrum of $Bi_2Sr_2CaCu_2O_8$ STEPHEN PARHAM, HAOXIANG LI, XIAOQING ZHOU, EDUARDO CALLEJA, University of Colorado at Boulder, GENDA GU, Brookhaven National Lab, KYLE MCELROY, DANIEL DESSAU, University of Colorado at Boulder — $Bi_2Sr_2CaCu_2O_8$ (Bi2212) is a dirty material. This is readily seen with STM, which shows nanoscale variations in the gap parameter and local doping level. Through numerical simulation we investigate the effects of this doping inhomogeneity on the ARPES spectrum of Bi2212. We find that the main effect of the inhomogeneity is to broaden the spectrum in momentum, with an increasing magnitude towards the antinode. This has implications for the scattering rates extracted from MDC or EDC analysis. We show that after removing the doping inhomogeneity the scattering rate measured with ARPES qualitatively agrees with that from STM and Optical Reflectivity.

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