

Abstract Submitted
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Ultrafast Gap Dynamics in $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ Studied by High Resolution trARPES STEPHEN PARHAM, HAOXIANG LI, JUSTIN WAUGH, XIAOQING ZHOU, THOMAS NUMMY, JUSTIN GRIFFITH, University of Colorado Boulder, Z. XU, J. SCHNEELOCH, R.D. ZHONG, GENDA GU, Brookhaven National Lab, DANIEL DESSAU, University of Colorado Boulder, DESSAU GROUP TEAM, GU GROUP TEAM — We perform time and angle resolved photoemission spectroscopy on optimally doped $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+\delta}$ (BSCCO-2212) using higher energy resolution than previously reported. This technique allows us to observe quasiparticle and gap dynamics directly in the time domain. We find that the quasiparticle decays have a rich momentum and energy dependence, with the general trend of faster decays closer to the antinode and faster decays inside the superconducting gap scale. We can understand this entire landscape by modeling the electrons as following a non-equilibrium, “pseudo”-temperature that controls all electrons in the zone. Using this model, which has zero free parameters, we find excellent agreement with the data.

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