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Exploring momentum, temperature and doping dependence of mass renormalization in $Bi_2Sr_2CaCu_2O_{8+\delta}$ H.X. LI, X.Q. ZHOU, S. PARHAM, T.J. REBER, Y. CAO, J.A. WAUGH, Department of Physics, University of Colorado at Boulder, CO 80309, USA, Z. XU, J. SCHNEELOCH, R.D. ZHONG, G. GU, Brookhaven National Lab, Upton, New York 11973, USA, H. BERGER, Département de Physique, Ecole Polytechnique Fédérale de Lausanne, CH-1015 Lausanne, Switzerland, G. ARNOLD, D.S. DESSAU, Department of Physics, University of Colorado at Boulder, CO 80309, USA — Among the many novel aspects of cuprate high-temperature superconductors, one of the most important is that the parent undoped state of these materials is a strongly correlated Mott insulator. How these correlations impact or contribute to the superconducting state in the doped materials remains a critical aspect of understanding the mechanism of high temperature superconductivity. From a newly developed technique of studying self-energy in Angle-Resolved Photoemission Spectroscopy (ARPES), we explore the mass enhancement at low frequency as a function of momentum, temperature and doping. Comparing our result to the other measures such as specific heat and quantum oscillation, we show that ARPES can be a highly useful tool for effective mass measurement.

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