

Abstract Submitted
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Quasiparticle dynamics in cuprate superconductors: probing the superconducting condensate FABIO BOSCHINI, E. H. DA SILVA NETO, E. RAZZOLI, M. ZONNO, G. LEVY, M. MICHIARDI, B. ZWARTSENBURG, P. NIGGE, R. P. DAY, A. K. MILLS, Quantum Matter Institute and Department of Physics and Astronomy, University of British Columbia, J. WEN, J. SCHNEELOCH, Z. XU, G. GU, Condensed Matter Physics and Materials Science, Brookhaven National Laboratory, D. J. JONES, A. DAMASCELLI, Quantum Matter Institute and Department of Physics and Astronomy, University of British Columbia — High- T_C superconductivity is a long-standing open problem in the modern physics. Thus, the development of novel techniques to approach the problem from yet unexplored points of view is crucial and highly desirable. Time- and angle-resolved photoemission spectroscopy (TR-ARPES) can provide new insights on long sought-after dynamical properties in High- T_C superconductors [1,2]. Here we will present a TR-ARPES study on underdoped Bi2201 and Bi2212 cuprate superconductors where we are able to track the temporal evolution of the superconducting condensate. In particular, we will show how the quasiparticle lifetime is modified upon the optical excitation, and also how the temporal evolution of the different terms contributing to the quasiparticle lifetime can be disentangled. Finally, the study of the momentum- and energy-dependence of the relaxation processes allows us to find a direct connection between recombination dynamics and ultrafast evolution of the superconducting condensate. [1] C. L. Smallwood et al. Science 336, 1137 (2012) [2] C. Piovera et al. Phys. Rev. B 91, 224509 (2015)

Fabio Boschini
University of British Columbia

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