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Ultrafast Quasiparticle Relaxation Dynamics across the Superconducting Vaporization Threshold in Bi2212 CHRISTOPHER SMALLWOOD, Materials Sciences Division, Lawrence Berkeley National Laboratory, WENTAO ZHANG, TRISTAN MILLER, GREG AFFELDT, KOSHI KURASHIMA, Materials Sciences Division, Lawrence Berkeley National Laboratory / Department of Physics, UC Berkeley, CHRIS JOZWIAK, Advanced Light Source, Lawrence Berkeley National Laboratory, TAKASHI NOJI, YOJI KOIKE, Department of Applied Physics, Tohoku University, HIROSHI EISAKI, Electronics and Photonics Research Institute, National Institute of Advanced Industrial Science and Technology, DUNG-HAI LEE, ALESSANDRA LANZARA, Materials Sciences Division, Lawrence Berkeley National Laboratory / Department of Physics, UC Berkeley — In cuprate superconductors, an important open question is the degree to which the timescales and pathways for quasiparticle relaxation relate to underlying mechanisms governing superconductivity, antiferromagnetism, charge ordering, and other types of competing orders. Time- and angle-resolved photoemission spectroscopy (time-resolved ARPES) is uniquely poised to address this question because of the technique's exceptional ability to simultaneously probe the time-, energy-, and momentum-dependent properties of quasiparticles and band structure. Previous time-resolved ARPES studies have examined quasiparticle dynamics in the very high and very low pump fluence regimes, but a systematic study of the changes in dynamics across the fluence vaporization threshold for superconductivity has not yet been undertaken. Here we report the results of studying this regime.

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