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Ultrafast Optical Spectroscopy of $Ba(Co_xFe_{1-x})_2As_2$ Superconductors[1] TIANQI LI, Ames Laboratory and Department of Physics and Astronomy, Iowa State University, LIANG LUO, NI NI, SERGEY BUD'KO, PAUL CANFIELD, JIGANG WANG, Department of Physics and Astronomy and Ames Laboratory-USDOE, Iowa State University — High-temperature superconductivity (HTS) represents one of the most visited macroscopic quantum phenomena. A particularly interesting example is FeAs-based systems showing superconductivity from 20-50K. The development of ultrafast spectroscopy techniques has provide unique access to transiently photoexcited quasiparticles and their dynamics. Although the understandings of static thermodynamics, electronic transport, and magnetic properties are progressing, ultrafast optical studies on these systems are scarce. Here, we investigated the femtosecond optical responses of optimally-doped superconducting $Ba(Co_xFe_{1-x})_2As_2$(x=0.7) and antiferromagnetic parent compound $BaFe_2As_2$. Time-resolved pump-probe differential reflectivity revealed several distinct dynamic decay processes – initial drop and slow recovery. The timescales and amplitudes of these components exhibited strong temperature dependence. Our results showed that the ultrafast optical response represents a new tool to study FeAs-based HTS.

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Tianqi Li
Ames Laboratory and Department of Physics and Astronomy,
Iowa State University

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