Abstract Submitted
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Ultrafast quasiparticle dynamics of Kondo insulator SmB_6 using THz spectroscopy[1] JINGDI ZHANG, Department of Physics, University of California, San Diego, JIE YONG, Department of Physics, University of Maryland, College Park, ICHIRO TAKEUCHI, Department of Materials Science & Engineering, University of Maryland, College Park, RICHARD GREENE, Department of Physics, University of Maryland, College Park, RICHARD AVERITT, Department of Physics, University of California, San Diego — Samarium Hexboride (SmB_6) is a prototype Kondo insulator with a hybridization gap of 19meV at low temperatures. It has been theoretically predicted to be the first topological insulator involving electron-electron correlations that is truly insulating in bulk. Recent progress in fabricating thin film SmB_6 [1] enables using terahertz spectroscopic methods to investigate topological surface states and carriers adjacent to the hybridization gap, potentially distinguishing these distinct contributions to the optical conductivity. We report on the photo-excited quasi-particle (QP) dynamics of the Kondo insulator SmB6, using ultrafast terahertz spectroscopy. The amplitude of the transient change in transmission increases with decreasing temperature, exhibiting a single-exponential decay that significantly decreases below the Kondo temperature. This phonon bottleneck originates from competition between QP recombination and re-excitation of QP across the hybridization gap by phonons.

[1] Yong, Jie, et al. arXiv preprint arXiv:1408.5413 (2014).

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