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Transient Reflectivity of a Low-Dimensional Quantum Magnet MICHAEL BISHOP, Natl High Magnetic Field Lab, HAIDONG ZHOU, University of Tennessee Knoxville, STEPHEN MCGILL, Natl High Magnetic Field Lab — Frustrated, low-dimensional spin systems have drawn wide interest due to their ability to exhibit novel quantum phenomena such as superconductivity, spin-liquid phases, and gapped spin excitations (e.g. Haldane, Spin-Peierls, etc.). $SrCu_2(BO_3)_2$, or SCBO, a close experimental realization of the Shastry-Sutherland model, is one such quantum system in which the singlet ground state is separated from the excited triplet state by an energy gap (35 K) that can be closed by high magnetic fields (>20 T). Furthermore, high magnetic field magnetization measurements reveal an unusual series of plateaus which occur when the magnetic field-tuned density of triplets becomes commensurate with the lattice periodicity. We have investigated the coupling of singlet and triplet pairing in SCBO to changes in its electronic structure using transient near-infrared reflectivity measurements. We investigated the temperature and magnetic field dependences of the transient reflectivity, and we will discuss these behaviors and their correlation with dimer spin excitations.

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