Abstract Submitted
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Ultrafast Dynamics of a Charge Density Wave via Time-Resolved Resonant Diffraction R.G. MOORE[1], SLAC National Accelerator Laboratory — Understanding the emergence of collective behavior in correlated electron systems remains at the forefront of modern condensed matter physics. The key to such an understanding is unraveling the contributions from the coupling degrees of freedom in exotic many body states. Density waves, both of charge and spin, have been studied for decades and a wealth of information and insight has been gained. However, there are still open questions that need to be solved for a complete description of the phenomena as there are several existing density wave systems that exhibit prototypical behavior while violating traditional theory. Ultrafast dynamics of such a system, TbTe3, has been investigated via time-resolved resonant diffraction at the SXR endstation at LCLS. Oscillations of the amplitude mode and coherent phonons have been observed previously in time resolved photoemission and reflectivity measurement but, here we reveal a direct observation of the lattice response via resonant diffraction. Watching dynamics of the two dimensional Te plane density wave diffraction peak at a resonant energy of a bystander Tb atom reveals new insights into the coupling responsible for the formation of the state. Results and comparison with previous time resolved measurements will be discussed.

[1]This work represents the efforts of more than 20 authors who will be acknowledged during the presentation.

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