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High THz field induced dynamics of Sr14Cu24O41

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Dynamical studies of far infrared excitations in materials have become possible following the recent development of techniques that enable the generation of terahertz electromagnetic radiation with high electric field values [1]. This energy range is extremely relevant for the study of many charge density wave compounds, which exhibit low frequency excitations associated with a collective response due to pinning. Sr14Cu24O41 is a quasi one-dimensional material whose structure consists of alternating layers of Cu2O3 chains and CuO2 ladders [2]. Both substructures become charge ordered below ~200K. Understanding the dynamics of Sr14Cu24O41 excitations in the far infrared has the potential not only to shed light onto the complex nature of charge ordering in this material, but also to help provide a better understanding of the nature of superconducting behavior in two-dimensional high temperature superconducting cuprates. In our work, high field terahertz pulses are used to investigate the static and dynamic properties of single crystal Sr14Cu24O41 samples grown by the traveling solvent floating zone method. We will present preliminary results of a field and time dependent terahertz study of Sr14Cu24O41.
[1] P. U. Jepsen et al., Laser Phot Rev 5, 124 (2011)
[2] B. Gorshunov et al., Phys Rev B 66, 060508 (2002)

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