Abstract Submitted
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Dynamics of the insulator to metal transition in high quality V2O3 thin films[1] ELSA ABREU, Dpt of Physics, BU, SIMING WANG, Dpt of Physics and Center for Adv Nanoscience, UCSD; Materials Science and Eng Pgm, UCSD, JINGDI ZHANG, KUN GENG, Dpt of Physics, BU, XIAOGUANG ZHAO, KEBIN FAN, Dpt of Mechanical Eng, BU, MENGKUN LIU, Dpt of Physics, UCSD, GABRIEL RAMIREZ, Dpt of Physics and Center for Adv Nanoscience, UCSD, XIN ZHANG, Dpt of Mechanical Eng, BU, IVAN K. SCHULLER, Dpt of Physics and Center for Adv Nanoscience, UCSD; Materials Science and Eng Pgm, UCSD, RICHARD D. AVERITT, Dpt of Physics, BU — Metal-insulator transitions (MITs) are a striking manifestation of the interactions between the various degrees of freedom in complex materials. Vanadium sesquioxide (V2O3) is a prototypical MIT material, transitioning from an antiferromagnetic insulator to a paramagnetic metal at Tc=170K. We present a detailed investigation of the insulator-to-metal dynamics in single crystalline thin films of V2O3 following optical and far-infrared excitation, measured using THz time domain spectroscopy. Conductivity dynamics induced below Tc by ultrafast photoexcitation can be quantitatively described by nucleation and growth of the metallic volume fraction, which eventually gives rise to the full metallic state of V2O3 on a timescale of about 50ps. We will discuss our results in the broader context of phase transition dynamics of the vanadates and related strongly correlated electron materials.

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