

Abstract Submitted
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Infrared Nano-imaging and nano-spectroscopy of phase transition in Ca_2RuO_4 JIAWEI ZHANG, State Univ of NY- Stony Brook, HANS BECHTEL, Advanced Light Source, Lawrence Berkeley National Laboratory, THOMAS CIAVATTI, XINZHONG CHEN, STEPHANIE CORDER, ZIHENG YAO, State Univ of NY- Stony Brook, MEIGAN ARONSON, Texas A&M University, MICHAEL MARTIN, Advanced Light Source, Lawrence Berkeley National Laboratory, CHANCHAL SOW, Kyoto University, FUMIHIKO NAKAMURA, Kurume Institute of Technology, YOSHITERU MAENO, Kyoto University, MENGKUN LIU, State Univ of NY- Stony Brook — We investigated the electric-field-induced insulator-to-metal transition (IMT) in bulk single crystal Ca_2RuO_4 . Ca_2RuO_4 is a $4d$ electron transition metal oxide which has an IMT above 358 K. By applying a DC voltage above the threshold of 40 V/cm, a discontinuous conductivity jump can be readily observed with a dramatic change of electron and phonon signatures at the infrared frequency range. With infrared nano-imaging and nano-spectroscopy enabled by the scattering-type scanning near-field microscope (s-SNOM) techniques, this phase transition and the propagation of insulator-metal phase boundary are revealed with 10 nm resolution. We will discuss different stages of the phase transition and the nano-textures observed during the experiment.

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