Abstract Submitted
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Evidences of nonthermal optically induced insulator-to-metal switching in VO_2[1] ZHENSHENG TAO, Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824-2320, TZONGRU T. HAN, Department of Physics and Astronomy, Michigan State University, E ast Lansing, Michigan 48824-2320, FARAN ZHOU, SUBHENDRA D. MAHANTI, PHILLIP M. DUXBURY, CHONG-YU RUAN, Department of Physics and Astronomy, Michigan State University, East Lansing, Michigan 48824-2320, DAVID TORRES, NELSON SEPULVEDA, Department of Electrical and Computer Engineering, Michigan State University, East Lansing, Michigan 48824-2320, DEPARTMENT OF PHYSICS AND ASTRONOMY, MICHIGAN STATE UNIVERSITY COLLABORATION, DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEER, MICHIGAN STATE UNIVERSITY COLLABORATION — Strongly cooperative structural and electronic phase transitions at near room temperature make VO_2 a promising material for an array of high-speed applications in electronics and photonics. The critical step that limits the ultrafast performance is the structural barrier, which is result of subtle interplay between the Mott and Peierls physics. Using femtosecond electron crystallography, we examine the sequence of events resulted from this interplay and show that the cooperative behavior induced by optically induced charge doping may provide an alternative pathway for efficient ultrafast switching bypassing the high thermodynamic barrier required in the temperature-driven phase transition.

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