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New STM Tip-induced Phases in 1T-TaS_2 LIGUO MA, YIJUN YU, State Key Laboratory of Surface Physics and Department of Physics, Fudan University, XIU FANG LU, YA JUN YAN, Hefei National Laboratory for Physical Science at Microscale and Department of Physics, University of Science and Technology of China, Y.H. CHO, SANG-WOOK CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, XIAN HUI CHEN, Hefei National Laboratory for Physical Science at Microscale and Department of Physics, University of Science and Technology of China, YUANBO ZHANG, State Key Laboratory of Surface Physics and Department of Physics, Fudan University — Transition metal dichalcogenide 1T-TaS_2 is a layered material featuring a unique set of charge density wave (CDW) phases. The close proximity of the CDW phases in energy makes the material prone to external perturbation, and the intricate electron-phonon and electron-electron interactions often lead to electronic/structural phase transitions in 1T-TaS_2. Here we report a new phase transition from the insulating commensurate CDW (also known as a Mott state) to a new metallic CDW state that is induced in 1T-TaS_2 by voltage pulses from an STM tip at low temperatures. We study the topographic and spectroscopic properties of the metallic CDW phase in detail with STM and Scanning Tunneling Spectroscopy (STS).

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