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Electronic signatures of dimerization in $IrTe_2$ JIXIA DAI, WEIDA WU, YOON SEOK OH, S.-W. CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University, Piscataway, New Jersey 08854, USA, J.J. YANG, Laboratory for Pohang Emergent Materials and Department of Physics, Pohang University of Science and Technology, Pohang 790-784, Republic of Korea — Recently, the mysterious phase transition around $T_c \approx 260$ K in $IrTe_2$ has been intensively studied. A structural supermodulation with q=1/5 was identified below T_c. A variety of microscopic mechanisms have been proposed to account for this transition, including charge-density wave due to Fermi surface nesting, Te p-orbital driven structure instability, anionic depolymerization, ionic dimerization, and so on. However, there has not been an unified picture on the nature of this transition. To address this issue, we have performed low-temperature scanning tunneling microscopy and spectroscopy (STM/STS) experiments on $IrTe_2$ and $IrTe_{2-x}Se_x$. Our STM data clearly shows a strong bias dependence in both topography and local density of states (STS) maps. High resolution spectroscopic data further confirms the stripe-like electronic states modulation, which provides insight to the ionic dimerization revealed by X-ray diffraction.

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