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STM study on single crystal of noncentrosymmetric superconductor $PbTaSe_2$ RUI WU, ZHIYANG YE, Institute of Physics, Chinese Academy of Sci (CAS) & Department of Physics and Texas Center for Superconductivity, University of Houston, JIHUI WANG, Department of Physics and Texas Center for Superconductivity, University of Houston, XUEJIN LIANG, HANQING MAO, LINGXIAO ZHAO, GENFU CHEN, Institute of Physics, Chinese Academy of Sci (CAS), SHUHENG PAN, Institute of Physics, Chinese Academy of Sci (CAS) & Department of Physics and Texas Center for Superconductivity, University of Houston, INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES TEAM, TEXAS CENTER FOR SUPERCONDUCTIVITY TEAM — We use low temperature scanning tunneling microscopy (STM) to study the single crystal of noncentrosymmetric superconductor $PbTaSe_2$. Two types of atomically resolved topographic image have been observed on the surfaces exposed by low temperature in situ cleaving. One of the topographic images clearly displays the noncentrosymmetric crystal structure, which we identify as the Se terminated surface. With the help of lattice symmetry and the step between two terraces, we also identify that the other topographic image belongs to the Pb terminated surface, which is the complementary exposure of the Se termination. In addition to the lattice symmetry and the surface reconstruction, there is a super modulation with a period of about 10.5 unit cells. This super modulation persists through the superconducting transition (Tc = 3.7K), but is energy dependent, indicating its electronic nature. We will show how this super modulation relates to the normal state tunneling spectrum.

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