

Abstract Submitted  
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**Real-space imaging of inelastic Kondo effect in a single O<sub>2</sub> molecule** YING JIANG, International Center for Quantum Materials, Peking University, Beijing 100871, China, WEI JI, Department of Physics, Renmin University of China, Beijing 100872, China, QING HUAN, ARTHUR YU, SHAOWEI LI, Department of Physics and Astronomy, University of California, Irvine, CA 92697-4575, WILSON HO, Department of Physics and Astronomy and Department of Chemistry, University of California, Irvine, CA 92697-4575 — Inelastic Kondo effect of the single O<sub>2</sub> molecule physisorbed on Ag(110) surface is investigated in real space using a low-temperature scanning tunneling microscope (STM) at 10 K. The O<sub>2</sub> molecule carries an unpaired spin, as supported by density functional theory, showing a Kondo resonance at the Fermi energy. The coupling between the vibrations and the unpaired electron in the O<sub>2</sub> molecule results in the inelastic Kondo effect, which is manifested as striking side peaks at finite biases in the dI/dV spectra, in clear contrast to the normal vibrational inelastic tunneling spectroscopy (IETS). Spectroscopic imaging shows that two vibrational modes are coupled to the Kondo resonance with different strengths, which arises from the symmetry match between the Kondo state and the vibrational modes.

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