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Quantum phase transition in Fe1+x(Te,Se) induced by Single-atomic Impurities studied by STM/S J. X. YIN, Institute of Physics, CAS, ZHENG WU, TcSUH University of Houston, XIONG HUANG, Z. Y. YE, RUI WU, X. J. LIANG, H. Q. MAO, JIAN LI, Institute of Physics, CAS, C. -S. TING, TcSUH University of Houston, J. P. HU, Institute of Physics, CAS, Z. Q. WANG, Boston College, P.-H. HOR, TcSUH University of Houston, HONG DING, S. H. PAN, Institute of Physics, CAS;Collaborative Innovation Center of Quantum Matter — Previously we discovered a robust zero-energy bound state at an interstitial Fe impurity (IFIs) in Fe1+x(Te,Se), which resembles the Majorana mode (Nature Physics 11, 543, (2015)). Here we report our comprehensive study, using scanning tunneling microscopy/spectroscopy technique, of the global effect of IFIs on the ground state of Fe1+x(Te,Se) over a wide range of IFI concentration x. Our high resolution tunneling spectroscopy and quasi-particle interference data at very low temperature demonstrate that IFIs do not affect the electron pairing strength, while they cause significant dephasing effect, which eventually drives the ground state of the system from strong-coupling-superconductivity to diffusive-Bose-metal.

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