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**Observation of multiple gaps and vortex bound states in Ba0.6K0.4Fe2As2 by Scanning Tunneling Microscopy/Spectroscopy** LEI SHAN, YONG-LEI WANG, BING SHEN, BIN ZENG, JING GONG, YAN HUANG, HUAN YANG, CONG REN, HAI-HU WEN, Institute of Physics and National Laboratory for Condensed Matter Physics, Chinese Academy of Sciences, Beijing 100190, China, ANG LI, SHUHENG PAN, Department of Physics and Texas Center for Superconductivity, University of Houston, Houston, Texas 77204-5002, USA, DA WANG, QIANG-HUA WANG, National Laboratory of Solid State Microstructures and Department of Physics, Nanjing University, Nanjing 210093, China — We report on low-temperature scanning tunneling microscopy/spectroscopy studies of the electronic structure in single crystalline Ba0.6K0.4Fe2As2. Multiple superconducting gaps were observed in the density of states (DOS) and the sizes of the two dominant gaps are 7.6 meV and 3.3 meV, respectively. The flat bottom of the DOS spectra near zero bias indicates the nodeless feature of the gaps, while the global fitting to the spectra requires definitely the anisotropy. By applying magnetic fields, we observed ordered vortices with Andreev bound states in vortex cores. The bound states and their spatial evolution can be qualitatively explained by our numerical calculations when considering the multiband s-wave superconductivity.

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