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Investigation of superconductivity in single layer FeSe on SrTiO₃ (001) by quasi-particle interference and impurity states TONG ZHANG, QIN FAN, WENHAO ZHANG, XI LIU, MIAO XIA, HONGYAN CHEN, RUI PENG, HAICHAO XU, BINPING XIE, DONGLAI FENG, Fudan University — Recently, single layer FeSe films on SrTiO₃ (001) were discovered to have much enhanced superconductivity [1]. Here by using scanning tunneling microscopy/spectroscopy, we investigated the superconductivity of single layer FeSe through quasi-particle interference (QPI), magnetic vortex mapping and impurity induced bound states. The films were grown by MBE and transfer to STM in-situ. The magnetic vortex lattice was observed in dI/dV mappings in the field. QPI mappings show that intra-band and inter-band scattering of superconducting quasi-particles have significant anisotropy. Single atom impurities were introduced on the surface by in-situ deposition. We found that nonmagnetic impurities (Zn, Ag, K) do not induce bound states in the superconducting gap, but the magnetic ones (Cr, Mn) do. Upon these observations, the pairing symmetry of single layer FeSe will be discussed.

[1] Q. Wang, et al., Chin. Phys. Lett. 29, 037402 (2012).

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