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Fermi surface topology and gap anisotropy in monolayer FeSe thin film YAN ZHANG, SIMES, LBNL, JAMES LEE, ROBERT MOORE, WEI LI, MING YI, SIMES, Stanford Univ., MAKOTO HASHIMOTO, DONGHUI LU, SSRL, SLAC, ZAHID HUSSAIN, LBNL, TOM DEVEREAUX, SIMES, Stanford Univ., DUNG-HAI LEE, UC Berkeley, ZHI-XUN SHEN, SIMES, Stanford Univ. — The discovery of superconductivity in monolayer FeSe thin film has generated great interests. The superconducting transition temperature (Tc) was reported to be over 65 K, which holds the record in iron-based superconductors. More intriguingly, the superconductivity was found only in one monolayer (1ML) film, while the films thicker than 1ML are non-superconducting. Utilizing the angle-resolved photoemission spectroscopy (ARPES), we studied the Fermi surface topology and superconducting gap anisotropy in 1ML FeSe. We resolved two ellipse-like electron pockets at the zone corner overlapping with each other. No hybridization between these two electron pockets was observed, which indicates that the glide mirror symmetry breaking due to the substrate is extremely weak in 1ML FeSe. Multi-gap behavior and gap anisotropy were further observed on the electron pockets. The superconducting gap minimums locate along the M-X direction for both inner and outer electron pockets. The observed Fermi surface topology and gap distribution provide a good starting point for constructing theoretical models and put strong constrains on determining the pairing symmetry in 1ML FeSe.

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