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Electronic Structure and Superconductivity in Bilayer FeSe\SrTiO$_3$ Films XU LIU, National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, CAS, Beijing 100190, China, WENHAO ZHANG, State Key Lab of Low-Dimensional Quantum Physics, Department of Physics, Tsinghua University, Beijing 100084, China, JUNFENG HE, LIN ZHAO, DEFA LIU, SHAOLONG HE, National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, CAS, Beijing 100190, China, CHUANGTIAN CHEN, ZUYAN XU, Technical Institute of Physics and Chemistry, Chinese Academy of Sciences, Beijing 100190, China, XUCUN MA, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, Chinese Academy of Sciences, Beijing 100190, China, QIKUN XUE, State Key Lab of Low-Dimensional Quantum Physics, Department of Physics, Tsinghua University, Beijing 100084, China, XINGJIANG ZHOU, National Lab for Superconductivity, Beijing National Laboratory for Condensed Matter Physics, Institute of Physics, CAS, Beijing 100190, China — We have carried out high resolution angle-resolved photoemission (ARPES) measurements on bilayer FeSe films grown on the SrTiO$_3$(001) substrate by the MBE method. Detailed doping evolution of the electronic structure has been investigated through an annealing process. Similar to the single-layer FeSe film, two phases are observed during the annealing process which coexist and compete. On the other hand, the bilayer FeSe film exhibits obviously different behaviors from that of the single layer FeSe film. Details of the experiment and their implications will be discussed.

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