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Observation of two distinct dxz/dyz band splittings in FeSe PENG ZHANG, TIAN QIAN, PIERRE RICHARD, Institute of Physics, CAS, XIAOPING WANG, Department of Physics, Tsinghua University, HU MIAO, BAIQING LV, BINBIN FU, Institute of Physics, CAS, THOMAS WOLF, CHRISTOPH MEINGAST, Institut fur Festkorperphysik, Karlsruhe Institute for Technology, XIANXIN WU, Institute of Physics, CAS, ZIQIANG WANG, Department of Physics, Boston College, JIANGPING HU, HONG DING, Institute of Physics, CAS — We report the temperature evolution of the detailed electronic band structure in FeSe single crystals measured by angle-resolved photoemission spectroscopy (ARPES), including the degeneracy removal of the dxz and dyz orbitals at the __Gamma/Z and M points, and the orbital-selective hybridization between the dxy and dxz/yz orbitals. The temperature dependences of the splittings at the Gamma/Z and M points are different, indicating that they are controlled by different order parameters. The splitting at the M point is closely related to the structural transition and is attributed to orbital ordering defined on Fe-Fe bonds with a d-wave form in the reciprocal space that breaks the rotational symmetry. In contrast, the band splitting at the __Gamma/Z points remains at temperature far above the structural transition. Although the origin of this latter splitting remains unclear, our experimental results exclude the previously proposed ferro-orbital ordering scenario.

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