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Spin-induced Symmetry Breaking of the Electronic Structure of CaFe2As2 QIANG WANG, ZHE SUN, ELI ROTENBERG, FILIP RONNING, ERIC BAUER, HSIN LIN, ROBERT MARKIEWICZ, MATTI LINDROOS, BERNARDO BARBIELLINI, ARUN BANSIL, DANIEL DASSAU — Neutron scattering experiments have shown that the ground state of undoped Fe-As compounds exhibits collinear magnetic structure, namely, FM coupling and AFM coupling exist simultaneously along the orthogonal Fe-Fe bonds. However, the corresponding electronic structure is still a mystery. Using ARPES, we measured the low-temperature antiferromagnetic (AFM) phase of high quality crystals of CaFe2As2. We found that, consistent with collinear magnetic structure, the electronic structure exhibits symmetry breaking along the orthogonal Fe-Fe bonds. This is also consistent with the LDA calculation. We also found that FM coupling and AFM coupling results in exotic band dispersions perpendicular to the Fe-As layers. These properties shed light on the true band structure of undoped Fe-As compounds and are indispensable for the study of superconductivity and paring mechanism in Fe-As superconductors.

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