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**Correlation-induced self-doping in iron-pnictide superconductor $Ba_2Ti_2Fe_2As_4O$** TIAN QIAN, JUNZHANG MA, Institute of Physics, Chinese Academy of Sciences, A. VAN ROEKEGHEM, Ecole Polytechnique, PIERRE RICHARD, Institute of Physics, Chinese Academy of Sciences, GUANGHAN CAO, Zhejiang University, SILKE BIERMANN, Ecole Polytechnique, HONG DING, Institute of Physics, Chinese Academy of Sciences — The electronic structure of the iron-based superconductor $Ba_2Ti_2Fe_2As_4O$ ($T_c^{onset} = 23.5$ K) has been investigated by using angle-resolved photoemission spectroscopy and combined local density approximation and dynamical mean field theory calculations. The electronic states near the Fermi level are dominated by both the Fe 3*d* and Ti 3*d* orbitals, indicating that the spacer layers separating different FeAs layers are also metallic. By counting the enclosed volumes of the Fermi surface sheets, we observe a large self-doping effect, *i.e.* 0.25 electrons per unit cell are transferred from the FeAs layer to the $Ti_2As_2O$ layer, leaving the FeAs layer in a hole-doped state. This exotic behavior is successfully reproduced by our dynamical mean field calculations, in which the self-doping effect is attributed to the electronic correlations in the 3*d* shells. Our work provides an alternative route of effective doping without element substitution for iron-based superconductors.

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