Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Electronic structure of the titanium-based oxypnictide superconductor $Ba_{0.95}Na_{0.05}Ti_2Sb_2O$ and direct observation of its charge density wave order QI SONG, JUAN JIANG, YAJUN YAN, ZIRONG YE, MINGQIANG REN, SHIYONG TAN, XIAOHAI NIU, BINPING XIE, TONG ZHANG, DONGLAI FENG, Fudan Univ — The unconventional superconducting ground state usually emerges in proximity to a spin or charge ordering state, such as that in cuprates, iron-based superconductors and layered chalcogenides. This unique character offers a platform for searching unconventional superconductivity in analogous layered compounds. Recently, superconductivity has been achieved in $Ba_{1x}Na_xTi_2Sb_2O$ with maximum Tc at 5.5 K, which makes this material more interesting. Here we perform high resolution angle-resolved photoemission spectroscopy and scanning tunneling microscopy studies on the titanium-based oxypnictide superconductor $Ba_{0.95}Na_{0.05}Ti_2Sb_2O$. The electronic structure shows both multi-orbital and three-dimensional nature, consistent with the theoretical calculations. The observed Fermi surface is well nested along the (π,π) direction, which might probably be the driving force of the CDW transition. This is further proved by the scanning tunneling microscopy result, which directly observed a CDW wave vector at (π,π) direction. However, due to the weak CDW coupling, we didn't observe the CDW gap here. Our results give a comprehensive picture of the electronic structure and direct observation of the CDW order in $Ba_{0.95}Na_{0.05}Ti_2Sb_2O$

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Date submitted: 06 Nov 2015 Electronic form version 1.4