MAR15-2014-000620

Abstract for an Invited Paper
for the MAR15 Meeting of
the American Physical Society

Superconductivity in single-layer films of FeSe with a transition temperature above 100 K[1]

JINFENG JIA, Shanghai Jiao Tong University

Recent experiments on FeSe films grown on SrTiO3 (STO) suggest that interface effects can be used as a means to reach superconducting critical temperatures (Tc) of up to 80 K. This is nearly ten times the Tc of bulk FeSe and higher than the record value of 56 K for known bulk Fe-based superconductors. Together with recent studies of superconductivity at oxides heterostructure interfaces, these results rekindle the long-standing idea that electron pairing at interfaces between two different materials can be tailored to achieve high temperature superconductivity. Subsequent angle-resolved photoemission spectroscopy measurements of the FeSe/STO system revealed an electronic structure distinct from bulk FeSe, with an energy gap vanishing at around 65 K. However, ex situ electrical transport measurements have so far only detected zero-resistance - the key experimental signature of superconductivity - below 30 K. Here we report the observation of superconductivity with Tc above 100 K in the FeSe/STO system by means of in situ 4-point probe electrical transport measurements. This finding confirms FeSe/STO as an ideal material for studying high-Tc superconductivity.

[1]In cooperation with Jian-Feng Ge, Zhi-Long Liu, Canhua Liu, Chun-Lei Gao, Dong Qian, Qi-Kun Xue, Ying Liu