Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Enhanced superconductivity in heavily electron doped surface layer of FeSe bulk crystal J.J. SEO, B.Y. KIM, Physics department, Yonsei University, B.S. KIM, Department of Physics and Astronomy, Seoul National University, J.K. JEONG, Physics department, Yonsei University, J.M. OK, J.S. KIM, Department of Physics, Pohang University of Science and Technology, J.D. DENLINGER, Advanced Light Source, Lawrence Berkeley National Laboratory, C. KIM, Department of Physics and Astronomy, Seoul National University, Y.K. KIM, Advanced Light Source, Lawrence Berkeley National Laboratory — The recording setting superconducting transition temperature of as high as 100 K discovered in 1 monolayer FeSe grown on SrTiO3 immediately brought attention to the mechanism for the dramatically enhanced Tc from its original value of 7 K. At present, the two most popular views for the enhanced Tc are interfacial effect and excess electron with enhanced correlation strength. The issue is controversial and there are evidences supporting each view. Here, we report the observation of 20 K superconductivity in the electron doped surface layer mimics all the key spectroscopic aspects of the electronic structure of 1ML FeSe on STO but with a smaller superconducting gap opening of 4 meV. Our results clearly show that excess electron doping with enhanced correlation strength alone cannot induce the maximum Tc, which strongly suggests a need for additional interfacial effect.

J.J. Seo
Physics department, Yonsei University

Date submitted: 06 Nov 2015 Electronic form version 1.4