Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Observation of Superconducting Fluctuations above Tc in underdoped BaFe2-xNixAs2 WEI ZHANG, HUIQIAN LUO, RUI ZHANG, XINGYE LU, BING XU, KAI WANG, RUN YANG, JINYUN LIU, Institute of Physics, Chinese Academy of Sciences, HAO YANG, College of Physics, Optoelectronics and Energy Collaborative Innovation Center of Suzhou Nano Science and Technology, Soochow University, XIANGGANG QIU, Institute of Physics, Chinese Academy of Sciences, INSTITUTE OF PHYSICS, CHINESE ACADEMY OF SCIENCES TEAM, COLLEGE OF PHYSICS, OPTOELECTRONICS AND ENERGY COLLABORATIVE INNOVATION CENTER OF SUZHOU NANO SCIEN TEAM — Angular dependent torque measurements have been performed on the electron doped iron pnictide superconductors $BaFe_{2-x}Ni_xAs_2$ with a series Ni doping ($0.03 \leq x \leq 0.3$). In the superconducting state, an irreversibility, as the evidence for the pinning of vortex, is observed between the torque measured with increasing and decreasing angle. Our results in underdoped sample ($x = 0.065$) show that the irreversible torque signal can survive up to a temperature T_{irr} well above the superconducting transition temperature T_c, suggesting the existence of superconducting fluctuations (SCF) above T_c. The Ni doping dependent phase diagram both for T_{irr} and T_c with a strong SCF region in the underdoped samples, is summarized based on our results.

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Date submitted: 04 Nov 2015 Electronic form version 1.4