Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

A close look at antiferromagnetic phase boundary in multidimensional phase diagram of electron-doped copper oxide HESHAN YU, GE HE, Chinese Academy of Sci (CAS), ZIQUAN LIN, Huazhong University of Science Technology, JIE YUAN, BEIYI ZHU, YI-FENG YANG, TAO XIANG, Chinese Academy of Sci (CAS), FEO.V. KUSMARTSEV, Department of Physics, Loughborough University, LIANG LI, JUNFENG WANG, Huazhong University of Science Technology, KUI JIN, Chinese Academy of Sci (CAS) — In copper-oxide superconductors, spin fluctuations play a predominant role in electron pairing with electron dopants yet composite orders veil the nature of superconductivity for hole-doped family. However, in electron-doped ones the ending point of AFM is still in controversy for different probes or its sensitivity to oxygen content. Here, by carefully tuning the oxygen content, a systematic study of Hall signal and magnetoresistivity up to 58 Tesla on optimally doped $La_{2-x}Ce_xCuO_{4\pm\delta}$ (x = 0.10) thin films identifies two characteristic temperatures at 62.5 K (error is 7.5 K) and 25 K (error is 5 K). The former is quite robust whereas the latter becomes flexible with increasing magnetic field, thereby linked to two- and three-dimensional AFM, evident from the multidimensional phase diagram as a function of oxygen as well as Ce dopants. Consequently, the observation of extended AFM phase in contrast to μSR probe corroborates an elevated critical doping in field, providing an unambiguous picture to understand the interactions between AFM and superconductivity.

Heshan Yu
Chinese Academy of Sci (CAS)

Date submitted: 02 Nov 2015 Electronic form version 1.4