Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Pressure-tuned superconductivity of iron chalcogenides LILING SUN, Institute of Physics, CAS, XIAO-JIA CHEN, Geophysical Laboratory, Carnegie Institution of Washington, Washington, D.C. , JING GUO, PEIWEN GAO, Institute of Physics, CAS, HANGDONG WANG, MINGHU FANG, Department of Physics, Zhejiang University, China, XIAOLONG CHEN, GENFU CHEN, QI WU, DACHUN GU, CHAO ZHANG, XIAOLI DONG, XI DAI, Institute of Physics, CAS, HO-KWANG MAO, Geophysical Laboratory, Carnegie Institution of Washington, Washington, D.C. , ZHONGXIAN ZHAO, Institute of Physics, CAS — In this talk, we present our recent progress in effect of pressure on superconductivity of newly discovered iron chalcogenide superconductors. We show that the either positive or negative pressure can tune superconductivity of this new kind of superconductors. Superconductivity with higher superconducting transition temperature Tc can reemerge after elimination of the initial superconducting phase upon compression. We find that the maximum Tc of the reemerging superconducting phase is as high as 48.7 K for $K_{0.8}Fe_{1.70}Se_2$ and 48 K for $Tl_{0.6}Rb_{0.4}Fe_{1.67}Se_2$, setting a new Tc record for chalcogenide superconductors. The presence of the second superconducting phase is proposed to be related to pressure-induced quantum criticality. Our findings open up the potential route for the exploration of high-Tc superconductivity in iron-based and other superconductors.

Liling Sun
Institute of Physics, Chinese Academy of Sceinces

Date submitted: 08 Nov 2011 Electronic form version 1.4