

Abstract for an Invited Paper
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Phase diagram and isotopic effect in high-Tc pnictide superconductors

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We will talk about the discovery of superconductivity with Tc higher than 40 K in Fe-based superconductors $\text{SmFeAsO}_{1-x}\text{F}_x$. Tc higher than McMillan limit of 39 K definitely proves pnictide superconductors high-Tc superconductivity^{1,2}. In this talk, we present the transport properties: resistivity, Hall coefficient and transport properties under high magnetic field. These results suggest a quantum phase transition around $x=0.14$ in $\text{SmFeAsO}_{1-x}\text{F}_x$ system. A electronic phase diagram is proposed, and coexistence of superconductivity and spin-density-wave is observed in Sm-1111 and Ba-122 system. We discuss the effect of isotopic effect on T_C and T_{SDW} in $\text{SmFeAsO}_{1-x}\text{F}_x$ and $\text{Ba}_{1-x}\text{K}_x\text{Fe}_2\text{As}_2$ systems. Our results show that oxygen isotope effect on T_C and T_{SDW} is very little, while the iron isotope exponent is about 0.35. Surprisingly, the iron isotope exchange shows the same effect on SDW transition as on superconductivity. Our results indicate that electron-phonon interaction plays some role in the superconducting mechanism, but simple electron-phonon coupling mechanism seems to be rather unlikely because a strong magnon-phonon coupling is included³. 1. Chen, X. H. et al. *Nature* 453, 761-762 (2008). 2. Liu, R. H. et al. *Phys. Rev. Lett.* 101, 087001 (2008). 3. R. H. Liu et al., *Nature* 459, 64-67(2009).