

Electron Correlations and Superconductivity in Iron Pnictides and Selenides

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I will summarize the description of iron pnictides as bad metals close to a Mott transition. As a particular consequence, isoelectronic substitution that increases the kinetic energy will suppress antiferromagnetic order and give rise to a quantum critical point; this is by now extensively verified by experiments in P doped compounds of parent iron arsenides (for a recent review, see Ref. [1]). Within the same framework, I will also consider the implications of the recently discovered 122 iron selenides for Mott transition and local-moment magnetism [2]. Finally, I will discuss how this description makes it natural that the pairing strength of the 122 iron selenides is similar to that of their pnictides counterparts in spite of very different Fermi surfaces [3].

[1] E. Abrahams and Q. Si, JPCM 23, 223201 (2011).

[2] R. Yu, J.-X. Zhu and Q. Si, PRL 106, 186401 (2011);
R. Yu, P. Goswami, and Q. Si, arXiv:1104.1445.

[3] R. Yu, P. Goswami, Q. Si, P. Nikolic and J.-X. Zhu, arXiv:1103.3259;
P. Goswami, P. Nikolic and Q. Si, EPL 91, 37006 (2010).