

# Crystal Structure and Superconductivity under pressure in the new Fe based compounds

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The study of the crystal and electronic structure under pressure is a powerful tool that helps to find clues to analyze the superconducting state. The case of the new iron based superconductors is an excellent example, where there are still plenty of opened questions to be answered.

In this presentation, I will discuss the effect of structural parameters under pressure on the superconducting properties on compounds belonging to the four representative Fe based

families. In particular, I reported the evidence of different structural phase transitions under pressure, for example in the case of *FeSe* the high pressure phase induce an increase in the superconducting transition temperature ( $T_c$ ) with a maximum at 34K[1]. We have observed similar behaviors in other compounds[2,3]. The effect on  $T_c$  of some characteristics parameters under pressure, like the inter(intra)layer distance, the angle Fe-As(Se)-Fe, are discussed in detail.

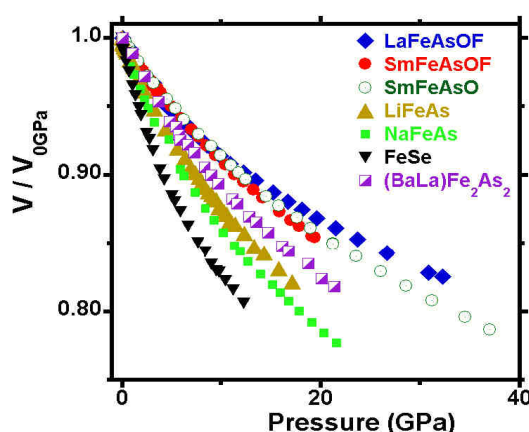


Figure 1: Dependence of the normalized volume with pressure for various of the studied compounds belonging to the four representative Fe based families that will be discussed in this seminar.

[1] G. Garbarino, et al, EuroPhys. Lett., 2009, **86**, 27001

[2] G. Garbarino et al, Phys Rev B (R) 2008, **78**, 100507

[3] M. Mito, M. Pitcher, W. Crichton, G. Garbarino et al, J. Am. Chem. Soc, 2009, **131**, 2986