# FeSi : a novel building-block for iron-based superconductivity

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Iron-based materials provide the latest platform for high-temperature unconventional superconductivity [1]. In these superconductors, the Fe atom is invariably associated to pnictogen (As, P) or chalcogen (Se, S, Te) elements, with the only and intensively debated exception of $YFe_2Ge_2$ [2,3]. This circumstance raises the important fundamental question about the link between Fe-based superconductivity and the apparent need of these pnictogens and chalcogens [3]. At the same time, to escape from such harmful and/or comparatively scarce As- or Se-like elements is highly desirable for applications.

In the talk I will introduce the new material LaFeSiH [4], which is first silicide that surpasses traditional pnictide and chalcogenide compounds as Fe-based superconductors, and discuss some of its physical properties. These include superconductivity with onset at 11 K, and its coexistence with antiferromagnetic order and orthorhombic distortion already in the parent phase.

[1] See e.g. H. Alloul and A. Cano (Guest Editors), Iron-based superconductors, C. R. Physique 17, 1 (2016) ; and the references therein.
[2] J. Chen et al., Unconventional Superconductivity in the Layered Iron Germanide YFe2Ge2, PRL 116, 127001 (2016).
[3] H. Kim et al., Crystal growth and annealing study of fragile, non-bulk superconductivity in YFe2Ge2, Phil. Mag. 95, 804 (2015) ; D. Guterding et al., Nontrivial Role of Interlayer Cation States in Iron-Based Superconductors, PRL 118, 017204 (2017).
[4] F. Bernardini, G. Garbarino, A. Sulpice, M. Núñez-Regueiro, E. Gaudin, B. Chevalier, A. Cano, and S. Tencé, Iron-based superconductivity extended to the novel silicide hydride LaFeSiH, PRB 97 100504(R) (2018).