



TRR 80 Sonderseminar

Am Dienstag, den 30. Januar um 16:00 Uhr

spricht

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über das Thema

FeSi: A new building block for iron-based superconductivity

The discovery of superconductivity in F-doped LaFeAsO added a new exciting chapter to the venerable field of high-temperature superconductivity [1]. Since then, a number of iron-based superconductors have been found [2]. However, in all these superconductors the Fe atom is invariably associated to pnictogen or chalcogen elements (P, As and Se, Te respectively). This circumstance raises the important fundamental question about the link between Fe-based superconductivity and the apparent need of these pnictogens and chalcogens [3].

I will present the novel iron silicide LaFeSiH displaying superconductivity with onset at 11 K [4]. We find that this pnictogen-free compound is isostructural to LaFeAsO, with a similar low-temperature tetragonal to orthorhombic distortion. Using density functional theory we show that this system is also a multiband metal in which the orthorhombic distortion is likely related to single-stripe antiferromagnetic order. Electrical resistivity and magnetic susceptibility measurements reveal that these features occur side-by-side with superconductivity, which is suppressed by external pressure.

[1] Y. Kamihara et al., *Iron-based layered superconductor La[O_{1-x}F_x]FeAs (x=0.05-0.12) with T_c = 26 K*, JACS 130, 3296 (2008)

[2] H. Hosono et al., *Exploration of new superconductors and functional materials, and fabrication of superconducting tapes and wires of iron pnictides*, Sci. Technol. Adv. Mater. 16, 033503 (2016).

[3] 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, M.-A. Méasson, A. Cano, and S. Tencé, *Iron-based superconductivity extended to the novel silicide hydride LaFeSiH*, arXiv:1701.05010

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-288, Institut für Physik,
Universität Augsburg statt.

Gastgeber: Prof. Dr. István Kézsmárki
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