



UNIVERSITÀ DEGLI STUDI DELL'AQUILA



DIPARTIMENTO DI SCIENZE FISICHE E CHIMICHE

Avviso di seminario

Chemical pressure effect in SmNiC₂

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Giovedì 25 Maggio 2017

Sala riunioni "G. Signorelli" –DSFC

ore 14:30

A series of Sm_{1-x}Ln_xNiC₂, where Ln=La and Lu, were synthesized by arc-melting method and annealed for 2 weeks at 850°C. Powder x-ray diffraction was used to analyze sample purity and the lattice parameters were calculated using LeBail refinement method. Physical properties were measured by means of magnetic susceptibility, electrical resistivity and heat capacity. SmNiC₂ is a ferromagnet with relatively high Curie temperature (T_C = 17 K). Since Sm is located almost in the middle of the lanthanides, it gives unique opportunity of chemical doping by large La as well as small Lu metal. This way increase (La doping) or decrease (Lu doping) in the unit cell volume is expected, which might be seen as negative or positive "chemical" pressure. The phase diagram reveals a sudden decrease of the charge density wave formation temperature (T_{CDW}) from 150K for SmNiC₂ to 55K for Sm_{0.75}La_{0.25}NiC₂. The Curie temperature decreases with both La and Lu substitution in Sm_{1-x}Ln_xNiC₂. Interestingly ferromagnetism is observed for Sm_{0.13}Lu_{0.87}NiC₂ and Curie temperature T_C = 3.5K was estimated from the Arrot plot. Further increase of La reveals superconductivity and the highest T_{sc} ~3K is obtained for pure LaNiC₂.



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Corso di laurea in Fisica

Corso di laurea Magistrale in Fisica

A.A. 2016/17

A short history of superconductivity

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Lezione

Venerdì 26 Maggio 2017

Aula A0.5 – edificio A. Turing

ore 11:30

Without any doubt, superconductivity is one of the most interesting phenomenon in physics. Although physicist are excited about the mechanism, material scientists are trying to find new compounds that reveal superconducting properties.

I will briefly describe history of superconductivity from its discovery in 1911 to a stinky superconductor (H_3S) reported in 2015. I will pay special attention to the superconducting materials and the way they have been found.