

Photoemission band structure of the weak itinerant ferromagnetic superconductor Y_9Co_7

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In the lecture a few of experimental results for the first weak itinerant ferromagnetic superconductor Y_9Co_7 will be shortly reviewed and discussed [1]. The discovery of superconductivity in Y_9Co_7 that exhibited at the same time the itinerant ferromagnetism was a big surprise because it showed that the two incompatible phenomena might be reconciled at some temperatures under certain thermodynamic conditions [1-3]. The recently discovered itinerant ferromagnetic superconductors are those strongly correlated electron compounds: UGe_2 , $URhGe$ and $UCoGe$. The physical properties of the latter one resembles strongly those observed in Y_9Co_7 [4]. The measurements of electrical resistivity, susceptibility, magnetization, specific heat, nuclear magnetic resonance and other properties show the magnetic transition at $T_C \cong 4.5$ K and the onset of superconductivity at about $T_s \cong 2.5$ K, revealing the coexistence state within a temperature interval below T_s [1-3]. Next, we focus attention on our recent Ultraviolet Photoemission Spectroscopy (UPS) and their comparison with our band structure calculations [5]. Interpretations are considered which take into account the characteristic structure of the compound and possible types of magnetic ordering.

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[2] A. Kołodziejczyk, "Magnetism and superconductivity in weak ferromagnets", *Physica B* 130, 189, 1985; and references cited therein.

[3] A. Kołodziejczyk, J. Spalek, *J. Phys. F: Met. Phys.* 14, 1277, 1984.

[4] A. Kołodziejczyk, „Coexistence of Superconductivity and Itinerant Ferromagnetism; Y_9Co_7 as an Example“, *IEEE/CSC & ESAS European Superconductivity News Forum*, No. 1, (2007), 1.

[5] A. Kołodziejczyk, B. Wiendlocha, R.Zalecki, J. Tobała, S. Kaprzyk, „Superconductivity, weak itinerant ferromagnetism and electronic band structure of Y_9Co_7 “, *Acta Phys. Pol. A* 111, 513-527, 2007.