Coexistence of superconductivity and ferromagnetism in the $d$-band metal $Y_9Co_7$

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Transport and thermodynamic properties of the binary intermetallic compound $Y_9Co_7$ [1] have been re-investigated through precision low-temperature measurements performed on a high quality polycrystalline sample. Our results provide solid evidence for a coexistence of itinerant ferromagnetism and superconductivity in $Y_9Co_7$ below $T_{sc} = 2.9$ K, as opposite to previous beliefs that superconductivity occurs in the paramagnetic phase embedded in a basically normal magnetic environment. Additionally, we demonstrate that the clean-limit condition is satisfied for a pure sample of this sole $d$-band ferromagnetic superconductor. Thus, the question whether magnetic fluctuations contribute in a formation of Cooper pairs in $Y_9Co_7$ remains open.

References: