High Pressure Studies of $(Sr,Ca)_3Ir_4Sn_{13}$ Single Crystals

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The $(Sr,Ca)_3Ir_4Sn_{13}$ system exhibits a rich phase diagram which was reported to display non Fermi-liquid physics and to host a coexistence of superconductivity and ferromagnetic spin-fluctuations.[1] We have conducted magnetic susceptibility and electrical resistivity measurements on $(Sr,Ca)_3Ir_4Sn_{13}$ single crystals up to 60 kbar. These measurements allow us to follow the evolution of the superconducting critical temperature T_c, the resistivity anomaly temperature T^*, the superconducting coherence length and the Fermi velocity under pressure. The pressure phase diagram constructed for $Ca_3Ir_4Sn_{13}$ shows a dome-shaped dependence of T_c. The initial rise in T_c, which is accompanied by a decrease in T^*, is consistent with the pressure dependence of material parameters extracted from the resistivity data.

[1]J. Yang *et al.*, J. Phys. Soc. Jpn. **79**, 113705 (2010).