

A New High Temperature Superconductor PuCoGa₅ and Its Implications

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We discuss the superconducting and normal states properties of PuCoGa₅ which is recently discovered f-electron based superconducting material at T_c=18.5 K. We first examine possible pairing mechanisms of superconductivity in PuCoGa₅ and found that the spin-fluctuations scattering is most consistent with the experimental data of resistivity. Analysis of NQR spin-lattice relaxation rate and Knight shift undoubtedly confirmed that PuCoGa₅ is an unconventional superconductor with lines of node as in D-wave superconductor. Finally, the pseudogap behavior found in PuRhGa₅ is examined in connection with the high-T_c cuprates superconductors. We conclude that Pu-115 superconductor is indeed bridging compounds connecting the 1K heavy fermion superconductors and the 100K HTSC and it will shed lights on the possible unifying pairing mechanism of an unconventional superconductors.

keywords : Pu superconductor, HTSC, Unconventional SC, Pairing mechanism