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Ce115's and beyond¹

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Recent studies of members of the Ce115 (CeMIn_5 ($M=\text{Co, Rh}$)) family of heavy-fermion materials have allowed a new perspective on the relationship between magnetism and unconventional superconductivity in strongly correlated electron systems. The antiferromagnet CeRhIn_5 under pressure, superconducting CeCoIn_5 in a magnetic field, and Cd-doped $\text{CeCoIn}_{5-x}\text{Cd}_x$ reveal a phase of long-range antiferromagnetic order that coexists microscopically with bulk, nodal superconductivity. Though the detailed relationship between these orders differs in each, evidence suggests that the order parameters are coupled irrespective of these differences and that similar conclusions may hold in structurally related CePt_2In_7 and the recently discovered 5f-electron compound PuCoIn_5 . Characteristics of magnetism and superconductivity in these 4f- and 5f-electron systems bear similarities to those in cuprate and iron-pnictide superconductors.

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