

MAR13-2013-020922

Abstract for an Invited Paper
for the MAR13 Meeting of
the American Physical Society

Superconductivity Near Quantum Critical Points

GILBERT G. LONZARICH, Shoenberg Laboratory for Quantum Matter, Cavendish Laboratory, University of Cambridge, Cambridge CB3 0HE, UK

The study of itinerant-electron systems on the border of charge and spin density wave transitions at low temperatures is leading to an increasing number of discoveries of unusual forms of superconductivity and other types of quantum order. Examples will be reviewed of electron-electron pair instabilities in particular on the border of ferromagnetic, antiferromagnetic, ferroelectric and structural quantum phase transitions. The superconducting transition temperature in a number of nearly magnetic metals from heavy fermion compounds to the copper oxide superconductors appears to scale with the characteristic spin fluctuation temperature. These best known materials will be compared and contrasted with examples from other classes of materials in which the spin fluctuation temperature far exceeds the peak of the superconducting transition temperature in the temperature-pressure phase diagram near a magnetic quantum critical point.