On Heavy Fermion Superconductivity and Quantum Criticality in the 115 series

KENNETH BURCH, University of California, San Diego — We have performed a detailed analysis of the optical properties of the 1-1-5 series (CeTIn5 where T=Co,Ir,Rh), revealing the hybridization gap (Δ) as key to understanding their rich phase diagram. Surprisingly we find that Δ for only one of the four bands crossing the Fermi surface determines the properties of the system. Furthermore, these carriers are the lightest and produce the smallest Δ. Additionally we discuss connections between this Δ, the superconducting transition temperature and the symmetry of the superconducting gap. This study demonstrates an experimental link between superconductivity and the parameter governing the magnetic Quantum Critical Point.

Kenneth Burch
University of California, San Diego

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