

Abstract Submitted  
for the MAR16 Meeting of  
The American Physical Society

**Strong Coupling Superconductivity in the Vicinity of the Structural Quantum Critical Point in  $(\text{Ca}_x\text{Sr}_{1-x})_3\text{Rh}_4\text{Sn}_{13}$** <sup>1</sup> WING CHI YU, YIU WING CHEUNG, Department of Physics, The Chinese University of Hong Kong, PAUL J. SAINES, Department of Chemistry, University of Oxford, MASAKI IMAI, TAKUYA MATSUMOTO, CHISHIRO MICHIOKA, KAZUYOSHI YOSHIMURA, Department of Chemistry, Kyoto University, SWEE K. GOH, Department of Physics, The Chinese University of Hong Kong — The family of the superconducting quasiskutterudites  $(\text{Ca}_x\text{Sr}_{1-x})_3\text{Rh}_4\text{Sn}_{13}$  features a structural quantum critical point at  $x_c = 0.9$ , around which a dome-shaped variation of the superconducting transition temperature  $T_c$  is found. In this talk, we present the specific heat data for the normal and the superconducting states of the entire series straddling the quantum critical point. Our analysis indicates a significant lowering of the effective Debye temperature on approaching  $x_c$ , which we interpret as a result of phonon softening accompanying the structural instability. Furthermore, a remarkably large enhancement of  $2\Delta/k_B T_c$  and  $\Delta C/\gamma T_c$  beyond the Bardeen-Cooper-Schrieffer values is found in the vicinity of the structural quantum critical point. Reference: Wing Chi Yu et al. Phys. Rev. Lett. (in press, 2015)

<sup>1</sup>This work was supported by the CUHK (Startup Grant, Direct Grant No. 4053071), UGC Hong Kong (ECS/24300214), Grants-in-Aid from MEXT (22350029 and 23550152), and Glasstone Bequest, Oxford

Wing Chi Yu  
Department of Physics, The Chinese University of Hong Kong

Date submitted: 03 Dec 2015

Electronic form version 1.4