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Search for quantum critical behavior in the specific heat of HTS cuprates¹ JEFFERY TALLON, MacDiarmid Institute, Industrial Research Ltd, FELIX BARBER, Industrial Research Ltd, JOHN COOPER, JOHN LORAM, Cavendish Lab., Cambridge University — Much evidence has been accumulated suggesting the presence of a quantum critical point in the lightly overdoped regime for high- T_c superconductors, around $p=0.19$ holes per Cu. It is however not decisive. In the neighborhood of a quantum critical point the normal-state electronic specific heat should contain a $T\ln(T)$ term. While this would be concealed by the onset of superconductivity it is in principle recoverable using the entropy balance that exists in a second-order phase transition. This paper reviews the data for $\text{Y}_{0.8}\text{Ca}_{0.2}\text{Ba}_2\text{Cu}_3\text{O}_{7-d}$ and $\text{Bi}_2\text{Sr}_2\text{CaCu}_2\text{O}_{8+d}$ and places limits on the magnitude and doping evolution of a $T\ln(T)$ term in the specific heat across the phase diagram.

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