Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Are the iron pnictides quantum critical? CHRISTOPH MEINGAST, FREDERIC HARDY, THOMAS WOLF, PETER ADELMANN, DORIS ERNST, PETER SCHWEISS, ROLF HEID, KAI GRUBE, Karlsruhe Institute of Technology, Institute for Solid State Physics, 76021 Karlsruhe, Germany, HILBERT V. LOEHNEYSEN, Karlsruhe Institute of Technology, Institute for Solid State Physics and Physikalisches Institut, 76021 Karlsruhe, Germany — Unconventional superconductivity is often found in the vicinity of a doping- or pressure-induced magnetic instability, or quantum phase transition (QCP). For a pressure-induced QCP, the Grüneisen parameter is expected to diverge as temperature approaches zero and is thus a very sensitive parameter for detecting the presence of a QCP. Experimentally, the Grüneisen parameter can "simply" be determined by the ratio of the thermal expansivity to the specific heat. Here we report on high-resolution thermal expansion and specific heat measurements of $Ba(Fe_{1-x}Co_x)_2As_2$ single crystals as a function of doping. The question of quantum criticality will be addressed by a detailed analysis of the measured thermodynamic data.

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Date submitted: 09 Dec 2009 Electronic form version 1.4