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Thermodynamic signatures of quantum criticality in $BaFe_2(As_{(1-x)}P_x)_2$ P. WALMSLEY, C. PUTZKE, L. MALONE, University of Bristol, S. KASAHARA, T. SHIBAUCHI, Y. MATSUDA, Kyoto University, A. CARRINGTON, University of Bristol — Iron based superconductors are one of many classes of material where superconductivity occurs in the vicinity of a magnetic quantum critical point (QCP). The degree to which the QCP drives or otherwise influences the high temperature superconductivity is however still a matter of debate. In this context it is useful to determine experimentally, the degree to which the quasiparticle effective mass diverges at the QCP and how this is reflected in various physical properties. Here we will report measurements of the specific heat γ and the de Haas-van Alphen effect which quantify these effects. Far from the QCP the enhancement of the mass as measured by γ, dHvA and the magnetic penetration depth λ are all consistent. However, very close to the QCP significant differences are found which likely result from finite temperature and/or multi-band effects.

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