MAGNETIC FIELD-TEMPERATURE SCALING IN UNCONVENTIONAL SUPERCONDUCTORS

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Many exotic metallic systems have a resistivity that varies linearly with temperature, and the physics behind this is thought to lead to high temperature superconductivity in cuprates and iron-pnictides. Although this phenomenon has attracted considerable attention, there have been few other experimental properties that are known to be linked to the same physics, making a microscopic description elusive. We report measurements of the high-field magneto-resistance of the iron-pnictide superconductor $BaFe_2(As_{(1-x)}P_x)_2$, and find that it obeys an unusual scaling relationship between applied magnetic field and temperature, with a conversion factor given simply by the ratio of the Bohr magneton and the Boltzmann constant. This suggests that magnetic fields probe the same physics that gives rise to the T-linear resistivity, providing a new experimental clue to this long-standing puzzle.