Anomalous normal state magneto-resistance in the noncentrosymmetric superconductor \( \text{Li}_2\text{Pt}_3\text{B} \)

B. J. TAYLOR, C. MCELROY, T. A. SAYLES, UCSD, A. C. MOTA, Festkoerperphysik, ETH-Zurich, M. BRIAN MAPLE, UCSD — The isotypic superconducting compounds \( \text{Li}_2\text{Pd}_3\text{B} \) and \( \text{Li}_2\text{Pt}_3\text{B} \) crystallize in a structure lacking physical inversion symmetry. In contrast to the inversion symmetry breaking superconductors \( \text{CePt}_3\text{Si} \), \( \text{CeRhSi}_3 \), and \( \text{UIr} \), to date, no evidence of magnetic order has been reported in either \( \text{Li}_2\text{Pd}_3\text{B} \) or \( \text{Li}_2\text{Pt}_3\text{B} \).

Through detailed magnetoresistive and magnetization measurements of \( \text{Li}_2\text{Pt}_3\text{B} \), we have observed behavior suggestive of a link between normal state electronic transport and magnetic behavior, and properties of the superconducting ground state. Corresponding changes in magnetoresistive and magnetic behavior are found wherein both properties exhibit two distinct features at high and intermediate temperatures. Remarkably, both features evolve as a function of magnetic field and temperature towards the \( T = 0 \) value of the superconducting upper critical field \( H_{c2}(0) \approx 1.5 \text{ T} \).

Polycrystalline samples of \( \text{Li}_2\text{Pt}_3\text{B} \) with the highest reported values to date of the superconducting critical temperature, \( T_c = 3\text{K} \), and residual resistivity ratio, \( \text{RRR} \approx 2 \), were used in this study.

\(^1\)This research was supported by U.S. DOE Grant No. DE-FG02-04ER46105 and NSF Grant No. DMR0802478.

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Date submitted: 21 Nov 2008