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Robust Resistive Critical Field in B20 AuBe and other Noncentrosymmetric Superconductors DJ REBAR, M KHAN, J BALL, P ADAMS, D BROWNE, D YOUNG, J PRESTIGIACOMO, Louisiana State University, JY CHAN, University of Texas at Dallas, JF DITUSA, Louisiana State University — AuBe is a superconductor with a chiral B20 structure which allows the possibility of spin-triplet superconductivity (SC) due to the lack of inversion symmetry. This structure type figures prominently in the formation of helimagnetism and the skyrmion lattice in magnetic B20 systems so that it is imperative to investigate the properties of a rare superconductor with this structure. Specific heat measurement revealed bulk SC with an exponential (BCS) form below T_c while magnetization indicated a Type I behavior near $T_c=3.2$ K and a crossover to Type II behavior below 1.2 K. Resistance measurements of the critical field revealed a phase boundary that deviates from that determined from magnetization measurements at approximately 2.4 K and which rises with decreasing T to approximately $4.3 \times H_{c2}$. The resistive critical field was also found to be robust against a Cr film deposited on the surface of AuBe indicating that a simple surface state is likely not responsible for the enhanced critical field. Other noncentrosymmetric compounds reported in literature exhibit similar behavior with resistance measurements displaying a significantly larger critical field than expected from BCS theory. We compare AuBe in context with this group and suggest further experiments.

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