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Superconductivity in AuBe D.J. REBAR, J.F. DITUSA, P. ADAMS, D. BROWNE, I. VEKHTER, D. YOUNG, J. PRESTIGIACOMO, Louisiana State University — Metallic AuBe, which forms with the chiral B20 crystal structure, is a superconductor (SC) with a T_c of approximately 3.2 K. Recent research on materials with this structure has revealed Skyrmion lattices, a topologically interesting magnetic state. We investigate the role the Dzyaloshinsky-Moriya interaction and spin-orbit coupling play in the superconductivity and normal state properties of this material. Samples were arc-melted in Ar atmosphere and characterized for structure and elemental composition. Magnetic susceptibility measurements revealed a full Meissner effect while the specific heat showed a sharp step at the transition temperature whose size is characteristic of a weakly-coupled SC. Measurements of the electrical resistivity at 1.8 K revealed a critical field that is five to six times that seen in the magnetization, far above the enhancement expected from a simple superconducting surface layer. In addition, we observed de Haas-van Alphen (dHvA) oscillations in these polycrystalline samples with two dominant frequencies indicating small spin-orbit split Fermi surfaces. We interpret the dHvA oscillations as emanating from a Dirac point approximately 0.4 eV below the Fermi level.

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