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Penetration depth, symmetry breaking, and gap nodes in superconducting $PrOs_4Sb_{12}$[1] LEI SHU, D.E. MACLAUGHLIN, Univ. of Calif., Riverside, R.H. HEFFNER, G.D. MORRIS[2], Los Alamos Nat. Lab., O.O. BERNAL, Calif. State Univ., Los Angeles, F. CALLAGHAN, J.E. SONIER, Simon Fraser Univ., Burnaby, Canada, A. BOSSE[3], J.E. ANDERSON, Univ. of Calif., Riverside, N.A. FREDERICK, W.M. YUHASZ, M.B. MAPLE, Univ. of Calif., San Diego — The vortex-state field distribution in the filled-skutterudite heavy-fermion superconductor $PrOs_4Sb_{12}$, in which there is evidence for time-reversal-symmetry (TRS) breaking, has been studied using transverse-field muon spin relaxation (TF-μSR). The superconducting-state TF-μSR relaxation rate $\sigma_s(T)$, a measure of the vortex-lattice field distribution width, is found to be nearly constant below $\sim T_c/2$. Our results suggest $\lambda(T) \approx$ const. at low temperatures, consistent with a nonzero gap for quasiparticle excitations. Surface penetration-depth measurements in zero static field yield $\lambda(T) - \lambda(0) \propto T^2$, which suggests point nodes in the gap. A similar discrepancy is found in the TRS-breaking superconductor Sr_2RuO_4, but not in a number of non-TRS-breaking superconductors, conventional and unconventional.

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