

**Low-field magnetic investigations of the superconducting state in
PrOs₄Sb₁₂**

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Superconductivity in the filled skutterudite compound PrOs₄Sb₁₂ appears to be unconventional, as inferred from, e.g., the lack of a coherence peak near $T_c=1.85$ K in the inverse nuclear-spin-lattice-relaxation time of Sb nuclei. Furthermore, spontaneous magnetic moments develop just below T_c , indicative of time reversal symmetry breaking. From measurements of dc isothermal magnetization curves for a PrOs₄Sb₁₂ single crystal, we have obtained the temperature dependence of the lower critical field $H_{c1}(T)$. Unexpectedly, a pronounced enhancement of $H_{c1}(T)$ emerges upon cooling below around 0.6 K (i.e., $T/T_c \simeq 0.3$). In addition, the critical current, estimated from remnant magnetization measurements, also increases faster upon lowering the temperature below 0.6 K. These experimental findings clearly point at another phase deep in the superconducting state of PrOs₄Sb₁₂. We will also discuss flux dynamics in PrOs₄Sb₁₂: while there is no obvious anomaly at $T/T_c \simeq 0.3$, vortex creep is extremely weak already below T_c . The very strong pinning in this material is in agreement with theoretical expectations for superconductors with broken time reversal symmetry.

9.7 cm

13.4 cm

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