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Absence of superfluid density anomaly at 0.6 K in superconducting $PrOs_4Sb_{12}$[1] D. E. MACLAUGHLIN, U. Calif., Riverside, LEI SHU, U. Calif., Riverside and U. Calif., San Diego, A. D. HILLIER, ISIS, Rutherford Appleton Lab., Y. AOKI, D. KIKUCHI, H. SATO, Y. TUNASHIMA, Tokyo Metro. U., H. SUGAWARA, U. Tokushima, T. A. SAYLES, M. B. MAPLE, U. Calif., San Diego
— The lower critical field $H_{c1}(T)$ in $PrOs_4Sb_{12}$ exhibits an enhancement below $T^* = 0.6$ K [1], suggesting a transition between two superconducting phases. Small anomalies are observed at T^* in some other properties but not in the specific heat. We have carried out muon spin rotation experiments in the vortex state for fields just above H_{c1}. The muon spin relaxation rate, which is proportional to the rms width $\delta B_{\rm rms}$ of the vortex-state field distribution, also shows no anomaly at T^*. In a simple picture both H_{c1} and $\delta B_{\rm rms}$ are proportional to the superfluid density ρ_s, i.e., $\delta B_{\rm rms} \propto H_{c1}$ contrary to observation. Our results suggest that the H_{c1} anomaly is due to flux pinning effects rather than a thermodynamic phase transition.
[1] T. Cichorek et al., Phys. Rev. Lett. **94**, 107002 (2005).

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