Lower Critical Fields and the Anisotropy in PrFeAsO$_{1-y}$ Single Crystals

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By utilizing miniature Hall-sensor array, we evaluated the lower critical fields $H_{c1}$ in Fe-based oxipnictide PrFeAsO$_{1-y}$ single crystals for $H \parallel c$ and $H \parallel ab$-planes. The temperature dependence of $H_{c1}$ for $H \parallel c$ is well scaled by the in-plane penetration depth and is consistent with a full-gap superconducting state. The anisotropy of penetration depths at low temperatures is estimated to be $\simeq 3$, which is much smaller than that of coherence lengths. This indicates the multiband superconductivity, in which the active band for the superconductivity is more anisotropic.