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Anisotropic London Penetration depth in $NdFeAsO_{0.9}F_{0.1}$ and $Ba_{0.55}K_{0.45}Fe_2As_2$. CATALIN MARTIN, R.T. GORDON, M.A. TANATAR, H. KIM, M.E. TILLMAN, N. NI, P.C. CANFIELD, V.G. KOGAN, R. PROZOROV, Ames laboratory and Department of Physics & Astronomy, Iowa State University, H. LOU, Z. WANG, H.H. WEN, National Laboratory for Superconductivity — In and out of plane London penetration depth was measured in single crystals of $NdFeAsO_{0.9}F_{0.1}$ (Nd-1111) and $Ba_{0.55}K_{0.45}Fe_2As_2$ (BaK-122) as a function of temperature by using an rf-resonator technique. In Nd-1111, penetration depth shows exponential behavior at low temperature, implying a fully-gapped Fermi surface. Superfluid density is best described in the full temperature range by a slightly anisotropic order parameter. In contrast, penetration depth of BaK-122 shows power-law temperature dependence ($\Delta\lambda(T) \propto T^n$, n$\approx$2) down to T$approx$0.02T$_c$ and anisotropy γ_λ varies from 2 at T$_c$ to about 4 at 0.5 K. Possible symmetries of the gap consistent with such behavior and comparison with results from other techniques and with proposed theoretical models will be discussed. Also, the temperature dependence of the anisotropy $gamma_\lambda = \lambda_c/\lambda_{ab}$, for both compounds, will be compared to that of $\gamma_{H_{c2}} = H^c_{c2}/H^{ab}_{c2}$, in connection with possible multiband superconductivity.

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