Electron Transport and Anisotropy of the Upper Critical Magnetic Field in $Ba_{0.68}K_{0.32}Fe_2As_2$ and $Ba(Fe_{0.92}Co_{0.08})_2As_2$ Single Crystals

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We report measurements of the temperature dependence of the electrical resistivity, $\rho(T,H)$, Hall resistivity, $R_{xy}(T)$, magnetic penetration depth, $\lambda(T,H)$ in hole-doped $Ba_{0.68}K_{0.32}Fe_2As_2$ and electron-doped $Ba(Fe_{0.92}Co_{0.08})_2As_2$ single crystals in zero, static, and pulsed magnetic fields up to 60 T, and $\rho(T,P)$ and thermopower $S(T,P)$ under hydrostatic pressures up to 15 $kbar$ as well. We find that $\rho(T)$ and $S(T)$ of $Ba_{0.68}K_{0.32}Fe_2As_2$ are well described by an exponential term due to inter-sheet umklapp electron-phonon scattering between light electrons to heavy hole sheets. Taking into account Pauli spin paramagnetism we can describe $H_{c2}(T)$. In contrast, we find that Pauli paramagnetic pair breaking is not essential for $Ba(Fe_{0.93}Co_{0.07})_2As_2$, where the data support a $H_{c2}(T)$ dependence that can be described by the Werthamer–Helfand–Hohenberg model for $H \parallel ab$ and a two-gap behavior for $H \parallel c$.