In-plane resistivity anisotropy in underdoped Ba(Fe$_{1-x}$Ni$_x$)$_2$As$_2$ and Ba(Fe$_{1-x}$Cu$_x$)$_2$As$_2$\(^1\) HSUEH-HUI KUO, JIUN-HAW CHU, JAMES ANALYTIS, LEO YU, KRISTIAAN DE GREVE, PETER MCMahON, YOSHIHISA YAMAMOTO, IAN FISHER, Stanford University — Underdoped Fe arsenide superconductors suffer a structural transition that is either coincident with, or precedes the onset of long range antiferromagnetic order. Crystals tend to form a dense array of twins upon cooling through the structural transition, but uniaxial pressure can be used to almost completely detwin samples, enabling measurement of the associated in-plane electronic anisotropy. Initial experiments on detwinned samples of Ba(Fe$_{1-x}$Co$_x$)$_2$As$_2$ revealed a large in-plane resistivity anisotropy which varied non-monotonically with cobalt concentration. Here we present data extending the initial study to include detwinned samples of Ba(Fe$_{1-x}$Ni$_x$)$_2$As$_2$ and Ba(Fe$_{1-x}$Cu$_x$)$_2$As$_2$. The composition-dependence of the resistivity anisotropy $\rho_b/\rho_a$ reveals a striking correlation with that of the Hall coefficient for all three substitution series.

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