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The study of vortex state across the phase diagram in single crystals of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ using current voltage characteristics.¹ X. Y. HUANG, Y. P. SINGH, D. J. HANEY, S. ZHANG, Kent State University, H. H. WEN, Nanjing University, T. HU, Shanghai Institute of Microsystem and Information Technology, M. DZERO, C. C. ALMASAN, Kent State University — Utilizing the current voltage (I-V) characteristic measurement, we investigate the vortex state of $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ single crystals across a wide doping range: under-doped ($x = 0.042$ and 0.056), near optimally-doped ($x = 0.06$ and 0.072), and the over-doped ($x = 0.1$). We compare the nature of the I-V characteristic curves obtained in our measurements with those of conventional type II superconductors. Using our data we could find a direct relationship between the critical current and flux-flow resistivity over the whole doping range studied. The implications of the comparison between the I-V curves of a conventional type II superconductor and $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ will be discussed. We will also comment on the observed relationship between the critical current and the flux-flow resistivity for the $\text{Ba}(\text{Fe}_{1-x}\text{Co}_x)_2\text{As}_2$ crystals studied.

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