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A study of the critical current density in optimally doped and under-doped thin-films of the cuprate superconductor $YBa_2Cu_3O_{7-\delta}$[1] E.S. BACKUS, M.C. SULLIVAN, Ithaca College, Ithaca NY — Scaling analysis of voltage vs. current isotherms has often been used to study the normal-superconducting phase transition in cuprate superconductors, and a consensus is now emerging regarding the critical exponents that govern this phase transition. In the past, researchers have measured the critical current and found mean-field exponents, however, sample quality and uniformity has greatly improved since those measurements were taken. With better samples it is possible to measure the critical regime exponents at temperatures very close to the critical temperature and also the mean-field exponents at temperatures that are further from the critical temperature. We conducted reverse polarity measurements sent through meander patterns in thin films of the cuprate superconductor $YBa_2Cu_3O_{7-\delta}$. We present our results as a plot of the critical current as a function of temperature in zero-field, and discuss both the critical regime and mean-field exponents.

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