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Magnetic field and temperature specific isotropic critical currents in strong-pinning high-temperature superconductors[1] Y.L. ZUEV, D.K. CHRISTEN, S.H. WEE, A. GOYAL, S.W. COOK, Oak Ridge National Laboratory — We report the observation of a unique temperature-dependent magnetic field, $H^*(T)$, at which the critical current of (R)BaCuO (R=rare earth) films with strong c-axis pinning can be nearly isotropic. That is, $J_c(\theta,\ H^*) \cong$ constant over nearly the entire interval of sample orientation from $H||c$ to $H||ab$ (in the full Lorentz force configuration). The phenomenon is observed in classes of HTS coatings that contain self-assembled, strongly pinning columnar stacks of second-phase precipitates, $BaZrO_3$, oriented near the c axis, and appears to originate from the combination of and offsetting effects of material anisotropies. Systematics of this behavior will be explored and several important control parameters will be identified.

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David Christen
Oak Ridge National Laboratory

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