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Magnetisation and the Irreversibility Line in Strongly Underdoped $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ ALIX MCCOLLAM, STEPHEN JULIAN, University of Toronto, RUIXING LIANG, DOUGLAS BONN, WALTER HARDY, University of British Columbia — Torque magnetometry experiments were made on a high purity single crystal of $\text{YBa}_2\text{Cu}_3\text{O}_{6.354}$. The irreversibility line $H_{irr}(T)$ was measured and found to lie very low in field, with a high temperature end-point at 5 K, far below the superconducting T_c of 12 K, and a steep upturn at the lowest temperatures. Considerable suppression of $H_{irr}(T)$ in the presence of a small AC magnetic field indicates that the irreversibility line is distinct from a flux-lattice melting transition in this material. A second feature $H^*(T)$, observed in the magnetisation data at fields above $H_{irr}(T)$, was unaffected by a similar AC field. Torque measurements as a function of crystal orientation revealed a sharp lock-in transition at angles of field close to the ab -plane, and illustrate the high degree of anisotropy in this system at very low doping levels.

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