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Vortex Dynamics in the High Temperature Superconductor $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ with In-plane Columnar Defects HEATHER QUANTZ, ANDRA PETREAN-TRONCALLI, Austin College, LISA PAULIUS, Western Michigan University, VALENTINA TOBOS, Lawrence Technological University, WAI-K. KWOK, Materials Science Division, Argonne National Laboratory — We investigated the vortex dynamics in a single crystal of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ before and after irradiation with high-energy heavy ions. Earlier studies have focused on the effects of irradiation-induced columnar defects parallel to the crystallographic c -axis of the crystal or at relatively large angles off the ab -plane. In our current study, we introduced columnar defects *along the in-plane layered structure* of the crystal. A single crystal of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ was polished down to a narrow width of $27\ \mu\text{m}$ allowing high energy heavy ions to penetrate the crystal along the ab -plane. The crystal was irradiated with $1.4\ \text{GeV}\ ^{208}\text{Pb}^{56+}$ ions to a dose matching field of 1T . We present analysis of vortex dynamics under various current densities, magnetic field strengths and orientations. This work was supported by the US Department of Energy, under contract DE-AC02-06CH11357 and by National Science Foundation under grant No. DMR-0072880.

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