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Influence of Splayed Columnar Defects on the Equilibrium and Irreversible Magnetization of $Tl_2Ba_2CaCu_2O_x$ [1] J.G. OSSANDON, University of Talca, Chile, J.R. THOMPSON, University of Tennessee and Oak Ridge National Lab, L. KRUSIN-ELBAUM, IBM Watson Research Center, H.J. KIM, University of Tennessee, D.K. CHRISTEN, Oak Ridge National Lab, J.L. ULLMANN, Los Alamos National Lab — Randomly oriented columnar defects (CD) were created in polycrystalline Tl-2212 superconductor via irradiation with 0.8 MeV protons. The fission-generated CD's had area densities corresponding to nominal matching fields $B_\phi = 0$ to ≈ 1.5 tesla. T_c decreased linearly from 97 K to 87 K with proton fluence, and the Meissner fraction decreased from 0.58 to 0.49. The current density J increased by $\sim 10^2$ at the optimal $B_\phi \approx 1$ T, accompanied by a 10 K elevation of the irreversibility line. Equilibrium magnetization $M_{\rm eq}$ decreases substantially with B_ϕ. While $M_{\rm eq}$ in the virgin material shows a London behavior $M_{\rm eq}(H) \sim \ln(H)$, it becomes distinctly non-London-like in the irradiated samples, due to vortex-defect interactions. This unusual field dependence resembles the $M_{\rm eq}(H)$ curves in Bi-2212 crystals irradiated with heavy ions.

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