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Influence of random point defects introduced by proton irradiation on the vortex pinning and dynamics of superconducting 122 iron arsenides[1] LEONARDO CIVALE, NESTOR HABERKORN, IGOR USOV, JEE-HOON KIM, BORIS MAIOROV, MARCUS WEINGARD, Los Alamos National Laboratory, G.F. CHEN, W. YU, Department of Physics, Renmin University of China, Beijing, China, W. HIRATA, S. MIYASAKA, S. TAJIMA, N. CHIKUMOTO, K. TANABE, Superconductivity Research Laboratory-ISTEC, 1-10-13 Shinonome, Koto-ku, Tokyo 135-0062, Japan — Vortex matter in iron-arsenide superconductors exhibits a rich phenomenology that is still largely unexplored. One way to understand and manipulate the pinning mechanisms and the vortex dynamics in superconductors is by the artificial introduction of additional defects. In this work we explore the influence of the random point defects introduced by proton irradiation on the vortex dynamics and critical currents of 122 iron arsenide superconductors. Our comparison includes Ca1-xNaxFe2As2 and Co-doped BaFe2As2 single crystals. We find that the influence of random point defects on the creep rate (S) and the elastic to plastic crossover of the vortex dynamics show a strong dependence with intrinsic superconductor parameters such as the coherence length. We analyze the magnetic field – temperature (H-T) vortex phase diagrams for the as-grown single crystals and the changes produced by the random point defects.

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