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High-field critical current enhancement by irradiation induced correlated and random defects in (Ba0.6K0.4)Fe2As2 KAREN KIHLSTROM, University of Illinois at Chicago, Argonne National Lab, LEI FANG, YING JIA, Argonne National Lab, Northwestern University, BING SHEN, ALEXEI KOSHELEV, ULRICH WELP, Argonne National Lab, GEORGE W. CRABTREE, University of Illinois at Chicago, Argonne National Lab, WAI KWONG KWOK, Argonne National Lab, ASGHAR KAYANI, West Michigan University , SHAOFEI ZHU, Argonne National Lab, HAI HU WEN, Nanjing University — Mixed pinning landscapes in superconductors are emerging as an effective strategy to achieve high critical currents in high, applied magnetic fields. Here, we use heavy-ion and proton irradiation to create correlated and point defects to explore the vortex pinning behavior of each and combined constituent defects in the iron-based superconductor $Ba_{0.6}K_{0.4}Fe_2As_2$ and find that the pinning mechanisms are non-additive. The major effect of p-irradiation in mixed pinning landscapes is the generation of field-independent critical currents in very high fields. At 7T and 5K, the critical current density exceeds 5_MA/cm2. This work supported by the Center for Emergent Superconductivity, an Energy Frontier Research Center funded by the U.S. D.O.E., Office of Science, Office of Basic Energy Sciences and by the D.O.E, Office of Basic Energy Sciences, under Contract No. DE-AC02-06CH11357. The operation of the ATLAS facility was supported by the U.S. D.O.E., Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357. The work in China was supported by the NSF of China, the MOST of China (2011CBA00102 and 2012CB821403) and PAPD.

Karen Kihlstrom
University of Illinois at Chicago, Argonne National Lab

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