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Influence of proton irradiation on the magnetotransport properties of $BaFe_2As_2$ and $BaFe_{1.985}Co_{0.015}As_2$ DOMINC MOSELEY, KAREN YATES, WILL BRANFORD, LESLEY COHEN, Imperial College London, DAVID MANDRUS, University of Tennessee, ATHENA SEFAT, Oak Ridge National Laboratory — Since their discovery in 2008, the iron-based superconductors have provided a new and unexpected system to probe the superconducting quantum phenomena. They have also presented the opportunity to investigate the intriguing interplay between magnetism, structure and transport properties. An additional complexity is the existence of Dirac Cones (DCs) within the electronic structure of the underdoped ferropnictides. In an attempt to elucidate the effects of these competing influences in the ferropnictides, we have performed a series of magnetoresistance (MR) experiments on proton irradiated undoped $BaFe_2As_2$ and sub-optimally doped $BaFe_{1.985}Co_{0.015}As_2$. Our findings show a non-saturating (up to 7T) linear MR above a temperature dependent critical magnetic field; in agreement with previous studies. Invoking the quantum linear magnetoresistance (QLM) model, it has been suggested that this infers the carrier transport dominance of DCs within the ferropnictides. Controlled proton irradiation allows us to test this concept by introducing random point defects into these materials. The conclusions drawn from this study will be discussed.

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