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Controlling quantum Hall edge state interaction in a graphene pn junction via device geometry modification SON T. LE, JOSEPH HAGMANN, GUANGJUN CHENG, ANGELA HIGHT WALKER, NIKOLAI KLIMOV, DAVID NEWELL, CURT RICHTER, The National Institute of Standards and Technology, JI UNG LEE, Suny Polytechnic, JUN YAN, University of Massachusetts at Amherst, UNIVERSITY OF MASSACHUSETTS AT AMHERST COLLABORATION, SUNY POLYTECHNIC COLLABORATION, THE NATIONAL INSTITUTE OF STANDARD AND TECHNOLOGY TEAM — The electrostatic profile of a pn junction may determine the way quantized Landau level (LL) edge states interact with each other [1,2]. Edge states at an electrostatically smooth junction are spatially further apart than those at a relatively abrupt junction, which decreases the probability of edge states mixing. We present a way to control LL edge state interaction through device geometry modification. A pnJ device with an electrostatic junction profile comparable to the one presented in [2] was experimentally fabricated and measured; however, it has a new geometry that alters the LL edge state interaction. In this device, we observe the lowest and second lowest LL edge states mix with each other in the quantum Hall regime. This ability to tune LL mixing opens up a new degree of freedom to fine tune quantum Hall resistance values for scalable resistance standard application. [1] J. R. Williams, L. DiCarlo, and C. M. Marcus, Science 317, 638 (2007) [2] Nikolai N. Klimov, Son T. Le, et al., Phys. Rev. B: Rapid Comm. (2015)

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