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Geometric interference observed in a high-mobility graphene ring CURT RICHTER, SON T. LE, JOSEPH HAGMANN, CHRISTOPHER GUTIERREZ, GUANGJUN CHENG, NIKOLAI KLIMOV, ANGELA HIGHT WALKER, JOSEPH STROSCIO, DAVID NEWELL, The National Institute Of Standards And Technology, JU UNG LEE, Suny Polytechnic, JUN YAN, University of Massachusetts at Amherst, UNIVERSITY OF MASSACHUSETTS AT AMHERST COLLABORATION, SUNY POLYTECHNIC COLLABORATION, THE NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY TEAM — We observe a strong quantum interference pattern in low-temperature resistance measurements of a ring-shaped h-BN/graphene/h-BN pn-junction device. The graphene has a mobility of 200,000 cm^2/Vs at a concentration of 10^{10} cm^{-2}. The ring is placed on top of a pair of buried gates that allow the left and right halves of the ring to be independently gated, forming gate-voltage quadrants for different carrier types across the ring. At low-temperatures, 400 mK to 10 K, the measured resistance as a function of gate voltage exhibits a strong interference pattern. The peaks and valleys are much larger in amplitude than the relatively weak Aharonov-Bohm oscillations observed when the magnetic field is swept at fixed gate voltage. The interference is robust and remains in the presence of moderate magnetic fields (on the order of 0.1 T). Tight-binding quantum transport calculations of the device geometry show a similar interference pattern, and systematic modeling indicates that the interference pattern arises from spatial quantization in the device.

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