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Boundary scattering in quasi-ballistic graphene/hexagonal boron nitride mesoscopic wires KAZUYUKI IGUCHI, Institute of Industrial Science, University of Tokyo, SATORU MASUBUCHI, IIS and Institute for Nano Quantum Information Electronics, University of Tokyo, TAKEHIRO YAMAGUCHI, MASAHIRO OHNUKI, Institute of Industrial Science, University of Tokyo, KENJI WATANABE, TAKASHI TANIGUCHI, National Institute for Materials Science, TOMOKI MACHIDA, IIS and INQIE, University of Tokyo, and PRESTO-JST — In a quasi-ballistic transport regime where the mean free path is larger than the width of conduction channel, diffusive boundary scattering results in an anomalous positive magnetoresistance due to a megnetic commensurability effect between cyclotron motion and sample width. In this work, we fabricate a high-mobility two terminal graphene mesoscopic wire on hexagonal boron nitride with a mean free path comparable to sample width $\sim$ 1 μm. Magnetoresistance of the graphene mesoscopic wire shows a peak structure at a magnetic field which scales with the ratio of the cyclotron radius R_c to the wire width w. The peak field increases with back-gate voltage as a consequence that the ratio w/R_c is modified due to the change in R_c. These results indicate the quasi-ballistic transport and diffusive boundary scattering in graphene on hexagonal boron nitride.

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