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Incidence Angle-dependent Transport across a Single Graphene $p-n$ Junction Formed by Buried Split-gates[1] SURAJIT SUTAR, EVERETT COMFORT, JIAN LIU, CNSE, University at Albany (SUNY), TAKASHI TANIGUCHI, KENJI WATANABE, National Institute for Materials Science, Tsukuba, Japan, JI UNG LEE, CNSE, University at Albany (SUNY), CNSE, UNIVERSITY AT ALBANY (SUNY) TEAM, NATIONAL INSTITUTE FOR MATERIALS SCIENCE COLLABORATION — Due to electron chirality effects, carrier transport across Graphene $p-n$ junctions (GPNJ) is predicted to have strong angular dependence [1]. This work reports evidence of such effects in a single GPNJ for various geometries created by the use of buried split-gates (SG). Standard processes are used to fabricate 2-terminal Graphene devices aligned to buried Polysilicon SG at different angles to the junction. Sweeping the SG biases V1 and V2 allows mapping the doping-dependent device resistance (Rt). For doping levels (V1,V2), subtracting the average unipolar resistance Rt(V1,V1) from the bipolar resistance Rt(V1,V2) gives the average junction resistance Rj(V1,V2), subtracting out both contact and channel resistances. For bipolar doping, Rj shows a sharper peak for tilted channels than one that is normal to the junction, the peak being sharpest for 45°, the largest angle probed. This trend is observed for both exfoliated and CVD Graphene, especially for higher mobility and lower widths, consistent with theory. The ratio of the maximal Rj for 45° and 0° devices is about 2.5, significant for the modest Graphene mobilities of our devices.
[1] V. Cheianov et al., ***Science,* 315**, 2007, pp 1252.

Surajit Sutar
CNSE, University at Albany (SUNY)

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