Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Nonlocal Transport in Graphene and Dilute Fluorinated Graphene HUA WEN, JING LI, JUN ZHU, Department of Physics, Pennsylvania State University, University Park — Non-local transport measurements using H-bar geometries are powerful probes of edge state physics and spin Hall effect. Recently, non-local resistance (NLR) measurements in hydrogenated and Cu-decorated graphene have reported sizable signals that exceed the contributions from diffusive transport, from which a large spin Hall angle is inferred [1]. The origin of the NLR remains controversial to date [2]. In this talk, we report our NLR measurements of both pristine and dilute fluorinated graphene. In pristine graphene, we find that the microscopic charge density distribution plays an important role in the magnitude of the NLR near the charge neutrality point. A diverse range of behavior that deviates from the diffusive transport model is observed and we discuss the implications. In a small perpendicular magnetic field of B <1 T, pristine graphene exhibits large NLR that may originate from thermoelectric effects. The NLR of fluorinated graphene devices, on the other hand, approximately follows the description of diffusive transport. No clear in-plane magnetic field dependence is found. The spin Hall angle, estimated from these preliminary studies, is likely to be small in dilute fluorinated graphene. [1] Balakrishnan, et. al. Nat. Phys. 9, 284 (2013); Balakrishnan, et. al. Nat. Commun. 5, 4748 (2014) [2] Kaverzin et. al. Phys. Rev. B 91, 165412 (2015)

Hua Wen
Pennsylvania State University

Date submitted: 09 Nov 2016 Electronic form version 1.4