Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Scaling behavior of the quantum Hall plateau-plateau transition in graphene p-n-p junctions WEI-HUA WANG, IAMS, Academia Sinica, CHENG-HUA LIU, National Taiwan University, PO-HSIANG WANG, Academia Sinica, TAK-PONG WOO, CHUN-WEI CHEN, CHI-TE LIANG, National Taiwan University — We present the observation of scaling behavior in graphene p-n-p junctions achieved by controlled metallic diffusion. Generally, metal deposition on graphene surface introduces substantial carrier scattering, which undermines the high mobility of intrinsic graphene. However, we discover a weakly functionalized regime of the deposited contact with small carrier scattering, while p-type doping of graphene is realized due to the metal oxide formation. Consequently, the resulted graphene channel are composed of p-type doped and an intrinsic regions. The high-quality graphene p-n-p junctions is evidenced by a pronounced quantum Hall effect and Shubnikov-de Haas oscillations. Remarkably, we observed a well-defined QH plateau-plateau transition of zeroth Landau level, yielding a scaling exponent of $\kappa=0.21\pm0.01$. Moreover, the graphene p-n-p junctions exhibit weak localization behavior, and the coherence length was found to be correlated to carrier scattering in the graphene devices.

Wei-Hua Wang
IAMS, Academia Sinica

Date submitted: 28 Jan 2016 Electronic form version 1.4