Abstract Submitted
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Pronounced half integer quantum-Hall effect in gated epitaxial graphene grown on SiC (0001) TIAN SHEN, ADAM NEAL, JIANGJIANG GU, MIN XU, MICHAEL BOLEN, MICHAEL CAPANO, Purdue University, LLOYD ENGEL, NHMFL, PEIDE YE, Purdue University — Large-area epitaxial graphene film by thermal decomposition of SiC wafer has provided a promising way to a viable electronics technology. By inserting a fully oxidized nanometer thin aluminum film as a seeding layer, graphene Hall-bar devices fabricated on the Si-face of SiC (0001) with high-k ALD Al_2O_3 gate stack were examined. At low temperatures, the half integer quantum-Hall effect in Hall resistance is observed along with pronounced Shubnikov-de Haas oscillations in diagonal magneto-resistance, which confirmed that the electrical properties of epitaxial graphene on SiC are essentially the same as those in exfoliated graphene films [1-4]. With top-gate modulation, the last quantum Hall plateau is especially pronounced and retains well-defined even at temperatures as high as 70K, reaching the temperature limit of the present experimental setup. From weak localization peak fitting, the phase coherence length of the gated epitaxial graphene is determined to be $\sim 1\mu$m at 1K and $\sim$ 200 nm at 70 K. [1] T. Shen et al. Appl. Phys. Lett. 95, 172105 (2009). [2] J. Jobst et al., arXiv:0908.1900v1. [3] X. Wu et al., arXiv:0908.4112. [4] A. Tzalenchuk et al., arXiv:0909.1220.

Peide Ye
Purdue University

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