Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

**Experimental evidence of one-dimensional edge states at the line junction of two oppositely biased bilayer graphene** J. LI, Department of Physics, Penn State University, University Park, USA, K. WATANABE, T. TANIGUCHI, National Institute for Material Science, 1-1 Namiki, Tsukuba, Japan, J. ZHU, Department of Physics, Penn State University, University Park, USA — A one-dimensional edge (kink) state is predicted to exist at the line junction of two gapped bilayer graphene with opposite electric field bias or the stacking fault of AB-BA stacked bilayer regions. The conductance of the kink state is expected to be quantized at $4e^2/h$ in the absence of K-K$'$ valley mixing, counting spin and layer degeneracy. This novel 1D system has not been realized experimentally due to fabrication challenges. Here we report evidence of the kink state in split dual-gated bilayer graphene, where the top and bottom splits are approximately 70 nm and precisely aligned. $h$-BN encapsulation ensures the high quality of the device, which allows us to make the bulk bilayer graphene very insulating at moderate E-fields of less than 0.3V/nm. The junction resistance $R_j$ exhibits drastic contrast between low resistances of several tens of $K\Omega$ when the two bilayers are oppositely biased, versus high resistances of several $M\Omega$ when the two E-fields have the same polarity. The low-resistance states are weakly insulating in temperature dependence and their resistances drop substantially in a perpendicular magnetic field. We discuss the nature of the kink state and possible reasons that $R_j$ deviates from the single-particle prediction of $4h/e^2$.

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Date submitted: 14 Nov 2014 Electronic form version 1.4