Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Strong Josephson Coupling in Planar Graphene Junctions JINHO PARK, Pohang University of Science and Technology, Korea, GIL-HO LEE, Harvard University, Cambridge, USA, JAE HYEONG LEE, Pohang University of Science and Technology, Korea, YOSITAKE TAKANE, KEN-ICHIRO IMURA, Hiroshima University, Japan, TAKASHI TANIGUCHI, KENJI WATANABE, National Institute for Materials Science, Japan, HU-JONG LEE, Pohang University of Science and Technology, Korea — A recent breakthrough of processing graphene, employing encapsulation by hexagonal boron nitride layers (BGB structure), allows realizing the ballistic carrier transport in graphene. Thereafter, ballistic Josephson coupling has been studied by closely edge-contacted BGB structure with two superconducting electrodes. Here, we report on the strong Josephson coupling with planar graphene junction in truly short and ballistic regime. Our device showed high transmission probability and the junction critical current (I_C) oscillating for sweeping the gate voltage along with the normal conductance oscillation (Fabry-Perot oscillations), providing a direct evidence for the ballistic nature of the junction pair current. We also observed the convex-upward shape of decreasing critical currents with increasing temperature, canonical properties of the short Josephson coupling. By fitting these curves into theoretical models, we demonstrate the strong Josephson coupling in our devices, which is also supported by the exceptionally large value of $I_C R_N (\sim 2\Delta/e$; $R_N$is the normal resistance).

Jinho Park
Pohang University of Science and Technology, Korea

Date submitted: 11 Nov 2016 Electronic form version 1.4