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Ballistic Transport in Graphene pnp Junctions Formed by Embedded Local Gates SEUNG-GEOL NAM, DONG-KEUN KI, Department of Physics, Pohang University of Science and Technology,Pohang, Korea, JONG-WAN PARK, Technology Development Team, National NanoFab Center, Korea, YOUNG-WOOK KIM, JUN-SUNG KIM, HU-JONG LEE, Department of Physics, Pohang University of Science and Technology,Pohang, Korea — Due to its gapless energy spectrum, one enables to tune the carrier type and density in graphene and realize pnp-type potential barriers in situ by using electrostatic gating. Such potential barriers provide opportunities to investigate novel phenomena such as Klein tunneling and quantum-Hall edge-state equilibration. In this study, we obtained high-quality graphene pnp junctions by embedding pre-patterned local gates in a substrate without dielectric-layer deposition or electron-beam exposure of the graphene sheet. We achieved ballistic and phase-coherent carrier transport in a graphene pnp device with a 130-nm-wide local gate, which is almost an order magnitude wider than reported previously[1]. In a high magnetic field, device with a 1-micro meter-wide local gate exhibited the $2e^2/h$ quantum-Hall plateau, indicating no backscattering in the local gate region. The conductance across our pnp junctions shows a gate-voltage dependence that is very distinctive from that of top-gated junctions, indicating a strong screening of the electric field by the embedded local gate. [1] A. F. Young and P. Kim, Nature Physics **5**, 222 (2009)

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