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**Robustness of quantum Hall effect in locally gated graphene devices**

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Two-terminal conductance of locally gated graphene  $p$ - $n$ - $p$  heterojunctions in the quantum Hall regime is quantized at integer and fractional values, owing to the edge states equilibration. We study the sensitivity of this quantization to finite longitudinal conductivity in the locally gated inner region of the junction. Taking a bulk conductivity approach, we solve spatially non-uniform conduction problem exactly by a conformal mapping method. We find that the robustness of the conductance quantization strongly depends on the geometry of the locally gated region, as well as on the densities in the inner and outer regions. We present a detailed comparison of our predictions with recent experimental data, finding good agreement.