

# **How Graphene's Quantum Hall Effect Defines the Ohm**

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Abstract: Did you know that the United States recently became the first nation to use graphene in how the unit of the ohm is defined?

Monolayer epitaxial graphene has been shown to have clearly superior properties for the improvement of devices (called QHRs) whose function depend on the quantum Hall effect and serve a critical role in defining electrical units for US industries. The recent progress in the development of these devices will be summarized in this talk, with specific focus on the following topics: (1) Stabilizing and controlling graphene's electron density over centimeter scales without the use of electrostatic gating. (2) Expanding the utility of these graphene-based QHR devices by creating arrays that employ superconducting electrical contacts. (3) Exploring the avenue of star-mesh networks to access many different quantum Hall resistance values.