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Insulating behavior at the neutrality point in dual-gated single-layer graphene FRANCOIS AMET, JAMES WILLIAMS, DAVID GOLDHABER-GORDON, Stanford University — The conductivity at the neutrality point in single-layer graphene is known to saturate on the order of e^2/h due to disorder-induced density fluctuations. In this study, we report contrasting results using dual-gated graphene devices with a boron nitride back-gate dielectric and a suspended top-gate, allowing for carrier mobilities over 100 000 cm^2/Vs. As the temperature is lowered, the peak resistivity at the charge-neutrality point unexpectedly diverges with a power-law behavior and becomes as high as several megohms per square. As a transverse magnetic field is applied, our device remains insulating and directly transitions to the ?=0 quantum Hall state. We discuss possible origins for this insulating behavior.

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