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Anomalous thermoelectric transport of Dirac particles in graphene PENG WEI, WENZHONG BAO, YONG PU, CHUN NING (JEANIE) LAU, JING SHI, Department of Physics, University of California at Riverside — We report a thermoelectric transport property study of single layer graphene devices in both classical and quantum Hall regimes. In zero magnetic field, by sweeping the gate voltage V_g to vary the carrier density n_{2D}, we demonstrate a diverging behavior in the Seebeck coefficient S_{xx}, i.e.$S_{xx} \sim 1/\sqrt{n_{2D}}$, which is a direct consequence of the linear energy dispersion of the massless particles. At low temperatures and high carrier densities, the Seebeck coefficient depends linearly on temperature, indicating the validity of the Mott relation. In the applied magnetic fields, we observe an anomalously large Nernst signal($\sim 6\ \mu$V/K*T) at the Dirac point. This is another unusual property expected for massless particles. At low temperatures where the quantum Hall effect is observed, both the Seebeck and Nernst signals show oscillations corresponding to the Landau levels manifested in the quantum Hall plateaus.

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