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Thermoelectric Corrections to Quantum Measurement JUSTIN BERGFIELD, Department of Physics, Department of Chemistry, Illinois State University, MARK RATNER, Department of Chemistry, Northwestern University, CHARLES STAFFORD, Deparment of Physics, University of Arizona, MASSIMILIANO DI VENTRA, Department of Physics, University of California — The voltage and temperature measured by a floating probe of a nonequilibrium quantum system is shown to exhibit nontrivial thermoelectric corrections at finite temperature. Using a realistic model of a scanning thermal microscope to calculate the voltage and temperature distributions, we predict quantum temperature variations along graphene nanoribbons subject to a thermal bias which are not simply related to the local density of states. Experimentally, the wavelength of the oscillations can be tuned over several orders of magnitude by gating/doping, bringing quantum temperature oscillations within reach of the spatial resolution of existing measurement techniques. We also find that the Peltier cooling/heating which causes the temperature oscillations can lead to significant errors in voltage measurements for a wide range of system.

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