Graphene is a material with remarkable electronic properties. However, the thermal properties of this two-dimensional Dirac Fermions, that determine the characteristics of photo detectors, plasmonic devices, and bolometers, are less explored. Here, we present our measurement of specific heat capacity, Wiedemann-Franz (WF), and electron-phonon (e-ph) thermal conductance from 0.3 to 100 K using the novel single layer graphene bolometer [1]. These measurements suggest that graphene-based devices can generate substantial advances in the areas of ultra-sensitive bolometry, calorimetry, microwave, and terahertz single photon detection for applications in areas such as observational astronomy, quantum information and measurement. The physics of the e-ph coupling and the possible violation of Wiedemann-Franz Law near the charge neutrality point in single layer graphene will be discussed.

This work is a collaboration with Emma Wollman, Harish Ravi, and K. C. Schwab of Caltech. This work has been supported by the FCRP Center on Functional Engineering Nano Architectonics (FENA) and U.S. NSF Contract No. (DMR-0804567).