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Observation of energy fluctuation PETERDAY, INSEOB HAHN, TALSO CHUI, *Jet Propulsion Laboratory/Caltech*, DAVID ROWE, ALEXA HARTER, *Physics Dept. California Institute of Technology* The fluctuation of energy is discussed in all thermodynamics textbooks because of the crucial role it plays in bringing to light the statistical uncertainties of all thermodynamic quantities. We will present data on the observation of the fluctuations of thermal energy between two masses connected by a thermally conducting link. By carefully measuring the temperature of each mass we are able to trace the random transfer of energies as small as 10^{13} joules from one mass to the other. As this happens, the conservation of energy implies that when the temperature of one mass rises the temperature of the other mass must fall. Detailed understanding of this phenomena in the framework of the fluctuation-dissipation theorem has helped the design of better thermometers. A recently developed magnetic salt thermometer with a $GdCl_3$ salt pill, has demonstrated a resolution of $5 \times 10^{-11} K/\sqrt{Hz}$.

Prefer Oral Session
 Prefer Poster Session

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