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Anomalous convective heat transport and rain formation in cryogenic helium K.R. SREENIVASAN, New York University, P. URBAN, P. HANZELKA, D. SCHMORANZER, Institute of Scientific Instruments ASCR, v.v.i., Královopolská 147, Brno, Czech Republic, L. SKRBEK, Faculty of Mathematics and Physics, Charles University, Ke Karlovu 3, 12116 Prague, Czech Republic
— When a hot body A is thermally connected to a cold body B, the conventional wisdom is that heat flows from A to B. Here we describe the opposite case in which *heat flows from a colder but constantly heated body B to a hotter but constantly cooled body A through the thermal link of two-phase cryogenic helium.* Specifically, we provide experimental evidence that heat flows through liquid and gaseous layers of cryogenic helium from constantly heated but cooler bottom plate of the Rayleigh-Bénard convection cell to its hotter top plate that is constantly cooled. The bottom plate is heated uniformly and the top plate is cooled by heat exchange with liquid helium maintained at 4.2 K. Additionally, for certain experimental conditions, a rain of helium droplets is detected by small sensors placed in the cell interior at about half of its height. These results are expected to be of some consequence to laboratory studies of phase change in atmospheric clouds.

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