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Experimental Test of the Fluctuation Theorem in a Driven System ZRINKA GREGURIC, George Mason University, MIGUEL CERVONI, George Mason University, JOHN CRESSMAN, George Mason University — In systems that are far from equilibrium it is possible that the entropy fluctuations of the system are smaller than zero. This behavior is theoretically predicted by several fluctuation theorems. In our work we studied the motion of a falling disk in a gravity driven system. On average the fluid exerts a dissipative drag on the falling body. However, these forces are dynamic and lead to fluctuations in the kinetic energy of the disk. The resulting power fluctuations are of the same magnitude as the mean power dissipated by the fluid and can be large enough to cause the disk to move upward against the force of gravity. To test the influence of the Reynolds Number on the fluctuations we used disks of the same geometry but different densities. The relative probability of negative to positive entropy production rates is compared to theoretical predictions.

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