Extreme reductions of entropy in an electronic double dot

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We measure extreme values of stochastic entropy production in an electronic double dot using millions of electron tunnelling events recorded at different bias points. We show that the probability distribution of the extreme reductions of stochastic entropy production is bounded by an exponential distribution with mean value equal to minus the Boltzmann constant, confirming the recent theoretical prediction for a nonequilibrium steady-state. We extend this theory and derive a general bound for the average of the maximum heat absorbed by a mesoscopic system from a thermal bath, and confirm this result experimentally.