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Thermodynamic and Information Entropy in Electroconvection JOHN CRESSMAN, George Mason University, MARCUS DAUM, George Institute of Technology, DAVID PATRICK, George Mason University, RORY CERBUS, WALTER GOLDBURG, University of Pittsburgh — Transitions in driven systems often produce wild fluctuations that can be both detrimental and beneficial. Our fundamental understanding of these transients is inadequate to permit optimal interactions with systems ranging from biology, to energy generation, to finance. Here we report on experiments performed in electroconvecting liquid crystals where we abruptly change the electrical forcing across the sample from a state below defect turbulence into a state of defect turbulence. We simultaneously measure the electrical power flow through the liquid crystal as well as image the structure in the sample. These measurements enable us to simultaneously track the evolution of the thermodynamic and information entropies. Our experiments demonstrate that there are strong correlations between the fluctuations in these two entropic measures however they are not exact. We will discuss these discrepancies as well as the relevance of large transient fluctuations in non-equilibrium transitions in general.

John Cressman
George Mason University

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