Abstract Submitted
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Using information theory for turbulence prediction: a statistical approach[1] WALTER GOLDBURG, RORY CERBUS, University of Pittsburgh — Information theory provides a tool for quantifying the amount of uncertainty or disorder in physical systems through the entropy density h. Going beyond this, physics is often concerned with prediction. The goal here is to predict a subsequent string of velocity measurements on the basis of a set of prior observations. The predictability is captured in a function called the system's statistical complexity C, which is the average information needed for the prediction. There have been very few attempts to use this theory with experimental data. We have measured C in a quasi-2D soap film flow as a function of Reynolds number Re. The measurements point to a sharp transition in C(Re) when the turbulence becomes fully developed. This approach to complexity through predictability promises to be an interesting way of looking at turbulence and other complex systems.

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