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Test of the Fluctuation Relation in compressible turbulence on a free surface[1] MAHESH BANDI, University of Pittsburgh, JOHN CRESSMAN, Krasnow Institute, George Mason University, WALTER GOLDBURG, University of Pittsburgh — The statistics of lagrangian velocity divergence are studied for an assembly of particles in compressible turbulence on a free surface. Under an appropriate definition of entropy, the two-dimensional velocity divergence of a particle trajectory represents the local entropy rate, a random variable. The statistics of this rate are shown to be in agreement with the steady-state fluctuation relation of Gallavotti and Cohen over a limited range of averaging times. The probability distribution functions obtained in this analysis exhibit features different from those observed in previous experimental tests of the fluctuation relation.

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