Local relaxation and maximum entropy states in two-dimensional decaying turbulence SERGIO SERVIDIO, Universita della Calabria, MINPING WAN, WILLIAM H. MATTHAEUS, University of Delaware, VICENZO CARBONE, Universita della Calabria — The phenomenon of vortex merging in two-dimensional turbulence has been investigated through direct numerical simulations. The fast and local processes that occur during the turbulent relaxation of a randomly initialized system in periodic geometry have been examined. The analysis reveals that many of the coherent structures can be described by a local principle of maximization of entropy. The validity of this entropy principle has been further confirmed by time-dependent statistics using a contour-tracking technique. Implications for the description of persistent coherent vortices commonly observed in nature are suggested, including growing evidence for the wide applicability of maximum entropy-based relaxation principles. [Phys. Fluids 22, 125107 (2010)].

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