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Evolution of mean flow and disturbances in strained vortices YUJI HATTORI, IFS, Tohoku University — Evolution of disturbed strained vortices is studied by direct numerical simulation. We choose 2D flattened Taylor-Green vortices as a base flow and add a small wave packet which grows exponentially due to the elliptical instability. The evolution consists of three stages: the linear, nonlinear, and turbulent stages. At the linear stage the wave packet located initially at the center of a vortex grows exponentially without significant change of the shape. At the nonlinear stage the wave packet collapses and small-scale structures develop. Concentration of vorticity in the mean flow, which is similar to the "expulsion of vorticity" in rotating turbulence, is observed before the transition to turbulence. Finally the flow becomes turbulent exhibiting the Kolmogorov energy spectrum although the mean flow is not far from the initial state. The mechanism behind the concentration of vorticity will be discussed in connection with angular momentum transfer and selective decay of inviscid invariants.

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