Abstract Submitted
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Vorticity dynamics in turbulence growth PAOLO ORLANDI, Universita' di Roma "La Sapienza", Italy — The statistical and structural properties of fully developed isotropic turbulence can be reproduced at high R_λ by numerical simulation with random forcing at large scales. A $k^{-5/3}$ energy spectrum range is observed. To understand why this range is formed inviscid and viscous time developing numerical simulations are performed starting with a certain number of Lamb dipoles. Inviscid simulations lead to a very strong vorticity amplification, which close to the eventual finite time singularity produces a k^{-3} range. The viscous simulations, depending on the viscosity, show an enstrophy production differing from the inviscid simulations. the enstrophy dissipation becomes of the same order of the enstrophy production, which does not blows-up and reaches a maximum. At this point the $k^{-5/3}$ range forms. The analysis in the strain-rate tensor principal axes shows that the enstrophy production is correlated with the intermediate $\widetilde{S}_2$ accounting for sheet-like structures.

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