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The growth rate of Rayleigh-Taylor turbulence depends on the large scale structures of the mixing OLIVIER POUJADE, CEA, YE ZHOU, Lawrence Livermore National Laboratory — The growth rate α_n of a turbulent Rayleigh-Taylor (RT) mixing layer is defined such that the mixing layer width $L(t) = \alpha_n \, A \, g(t) \, t^2$, where A is the Atwood number and $g(t) \sim t^n$ is the time history of the acceleration. We will show that the ensemble averaged growth rate of Rayleigh-Taylor can be inferred theoretically from first principle assuming a low Atwood mixing, analyticity of large scale turbulent spectra (for small k the spectra behave like $E(k) \sim k^p$) and self-similarity at late time. The expression of α_n depends on the value of n and p. Although it can be counter intuitive, the evolution of the mixing zone width is proved to depend most importantly upon what happens at the center of the mixing zone.

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