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Inverse cascades in RT and RM Instabilities

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Experimental and numerical results on the advance of a mixing front occurring at a density interface due to gravitational acceleration or a shock are analyzed considering the multifractal and spectral structure of the frontal systems. The experimental configuration consists on a unstable two layer system held by a removable plate in a box [1]. The initial density difference is characterized by the Atwood number. The evolution of Rayleigh-Taylor(RT) instability As the plate is removed the gravitational acceleration, generates a combination of spikes and bubbles, which reach maximum complexity and local mixing efficiency before the front reaches the end walls. The instability produced if a shock or suddent acceleration takes place is known as Richtmyer-Meshkov (RM) instability, Both cases are studied analyzing mixedness,[2] the third order structure functions, that indicate strong inverse cascades towards the large scales producing spectral variations[3]. The mixing processes are compared by mapping the different intermittency and the multifractal scaling in the spike and bubble arrays

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