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Shock driven Instabilities and Mixing in Interfaces

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Experimental and numerical results on the advance of fronts due to a shock in gravitational acceleration are shown as an unstable two layer system by dropping a box on rails to generate Richtmyer-Meshkov(RM)instability driven fronts [1,2]. The evolution of the turbulent mixing layer and its complex configuration shown For an impulsive acceleration, there are two components. The RM impulse from a shock is greatly reduced at high Mach number due to compressibility [3,4]. The analysis of Kelvin-Helmholtz, Rayleigh-Taylor (RT), Richtmyer-Meshkov and of accelerated instabilities is presented locally. Keulegan number is used at the flows using the buoyancy frecuency [5,6]. Multifractal analysis is compared in both experiments. Another effect is related to the dynamical behaviour of turbulent plumes[7,9] is an interpenetration of the unstable plumes only through a fraction of the area because once the dense fluid looses its potential energy it may not mix with the lighter fluid, therefore, a lower mixing efficiency is found. Comparing different types of experiments (i.e. Shock tube fronts, overturning interfaces,[4]convective flows,[7] etc..) it is interesting to non dimensionalize the flow with a lenthscale related to the local turbulent intensity [8] such as the Ozmidov scale and the Kolmogorov length scale. The stable stratification reduces the fractal dimension of the turbulence [1]. The intermittency and the multi-fractal spectra (for different levels of the marker) is that velocity, vorticity and volume-fraction or scalar concentration exhibit different scaling laws [9, 10].Shocks happen in many physical situations and is an important issue to understand the properties of mixtures and to relate them in a dynamical parameter space [8].

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