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Experimental investigation on the behaviour of a shock accelerated spherical gas inhomogeneity

Guillaume Layes[1], Georges Jourdan[1], Lazhar Houas[1], Denis Souffland[2] & François Renaud[2]

1. Polytech'Marseille DME - IUSTI/UMR CNRS 6595
13453 Marseille Cedex 13, France
Guillaume.Layes@polytech.univ-mrs.fr

2. CEA / DAM,
BP 12 91680 Bruyères-le-Châtel, France

An experimental investigation of the interaction of a plane shock wave and a single gaseous bubble has been conducted in a shock tube, in order to better understand the Richtmyer-Meshkov instability process in spherical geometry and the generated turbulent mixing. Different gaseous bubbles, i.e. helium, nitrogen and krypton, were introduced in air at atmospheric pressure within the experimental chamber. Those configurations correspond to negative (H/L), close to zero (CD) and positive (L/H) initial density jumps across the interface. The shock tube is coupled with a high speed rotating camera shadowgraph system synchronized with a stroboscopic Nanolite flash lamp (one flash each 70 μs) which allows to record about 100 frames per run. Thus, we reconstruct the experimental history of the gaseous inhomogeneity motion and deformation and then measure different inhomogeneity characteristic sizes (length, height vortex pair spacing...). Fig.1b is an example of results which will be presented during the workshop.

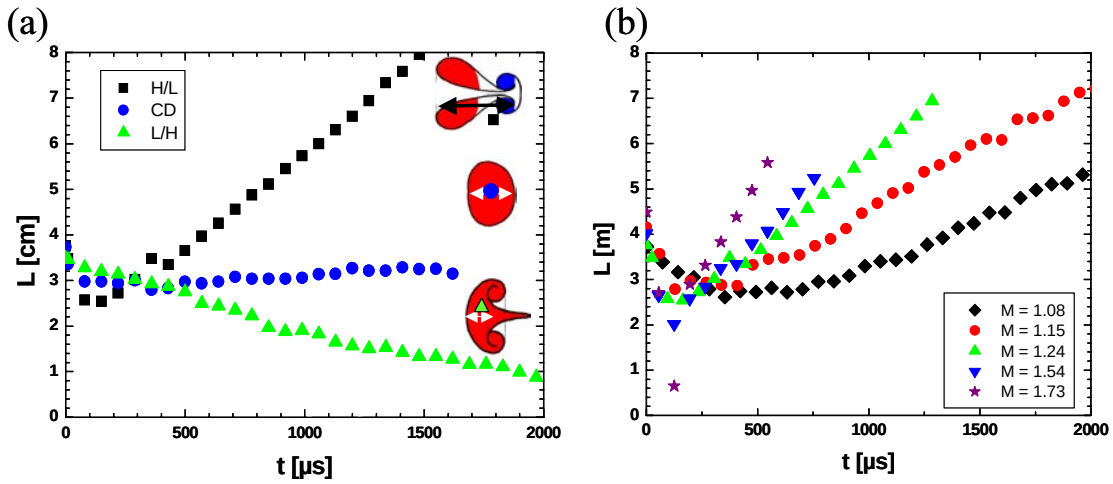

Figure 1: Evolution of the inhomogeneity length with time (a) for the H/L, Cd and L/H cases for a similar shock wave Mach number (≈1.2) and (b) for different shock wave Mach number for the H/L configuration

References

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