Experiments on the growth rate of single and two modes RM instability by re-shock

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Abstract: The growth rate of single and two modes RM instability by re-shock is studied in shock tube experiments. The experiments were conducted at shock Mach number 1.2, using the shock tube (200 *mm*×100 *mm*) with a two-zone test cell arrangement of Air/SF_6. Gas was separated by means of thin nitrocellulose membranes(≈0.5μm), supported by fine wire(dia.≈0.1*mm*) meshes. The configurations of Air/SF_6 inter faces are single and two modes, and their shapes are described by the following functions:

$\eta_1=7\cos(2\pi y/\lambda)$, $\lambda=100mm$, $0\le y\le 200mm$;

$\eta_2=3\sin(2\pi y/\lambda_1)+5(\cos(2\pi y/\lambda_2)-1)$, $\lambda_1=50\ mm$,$\lambda_2=100mm$,$0\le y\le 200mm$.

The initial perturbation width of single mode is equal to two modes. The length of the initial SF_6 section was changed (120*mm,* 230*mm* and 340*mm*) in order to impose different arrival times, thus allowing the Air/SF_6 interface to evolve into different phases before the arrival of the reflected shock wave. The turbulent mixing zone(TMZ) evolution was measured using a schlieren diagnostic technique. Their laws of growth rate of single and two modes RM instability by re-shock is presented.