The Numerical Studies on Rayleigh-Taylor Instability of Aluminum Plates Driven by Detonation

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ABSTRACT

The author, using elastic-plastic hydrodynamic code, presents the Rayleigh-Taylor instability of Al plates driven by high-explosive detonation. The numerical studies assume the material is fluid, or assume it is an elastic-plastic solid, and compares the results of these simulations to the experimental data. For the numerical simulation of Rayleigh-Taylor instability of the metal driven by high-explosive detonation, the elastic-plastic effect must be assumed. The result of simulation is different with the experiment, using only equation of state. However, the growth of perturbation agrees well with the measured growth under the second assumption. There is a cutoff wavelength for RT instability of the metal. The growth of perturbation is stable for short wavelength. The growth increases rapidly as the wavelength increases.