

## **Numerical study on oblique detonation surface instability**

**\*H. Teng, Z. Jiang**

State Key Lab of High Temperature Gas Dynamics, Institute of Mechanics, Chinese Academy of Sciences, Beijing,  
100190, China

\*Corresponding author: honghuiteng@gmail.com

Oblique detonation waves are simulated to study the instability of the detonation surface. Shock capturing method is the MSUCL-Hancock scheme and the chemical reaction mechanism is one-step heat release model. To make sure the overdriven detonation has the same resolution, the pre-exponential factor is decided with the help of detonation shock polar relation. Numerical results show oblique detonation surface becomes unstable when the degree of overdrive decreases. However, the reaction zone length oscillation can be observed even for a high overdrive degree, which is different from one-dimensional overdriven detonation. Furthermore, several cases are simulated to study the influence of the inflow Ma besides the overdrive degree. It is found in the case of the same chemical parameters, the detonation becomes unstable when the inflow Ma decreases.

**Keywords:** shock capturing, detonation, instability, overdriven, resolution