

The interaction of shock waves with multiple vortices in an initial supersonic jet

H.H. Zhang, Z.H. Chen*

Key Laboratory of Transient Physics, Nanjing University of Science & Technology, Nanjing, China

*Corresponding author: chenzh@mail.njust.edu.cn

The initial structure of a supersonic planar jet at $Ma=1.4$ was studied with use of large-eddy simulation (LES). Our numerical results provide a better understanding of the physical nature of the formation and evolution of the initial supersonic jet. Moreover, based on the data we obtained, the analysis of the different patterns of shock-vortex interactions, such as shock-shear layer interactions and two kinds of shock-vortex interactions (strong and weak interactions), was carried out. Furthermore, the generation of acoustic waves, and both the shock wave and the vortex deforming during the interaction were also discussed.

Keywords: Supersonic jet, Vortex, Mixing layer, Shock-vortex interaction

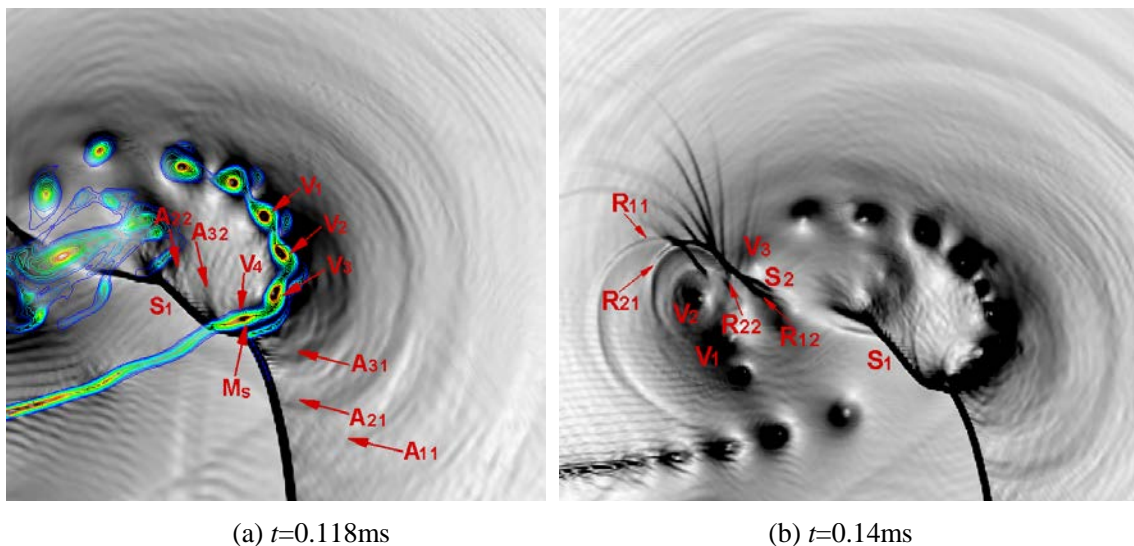


Fig.1 First derivative of pressure of the initial supersonic jet flow.