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Computational study of stationary shock wave instability toward a laboratory experiment NAOFUMI OHNISHI, Department of Aerospace Engineering, Tohoku University — We have investigated standing accretion shock instability (SASI) in core-collapse supernova cores by multi-dimensional simulations with steady-state initial conditions for examining its effects on the explosion mechanism so far. Numerical results positively suggested that SASI assists a shock revival due to a net heating increase in SASI-induced turbulence behind the shock wave for not only two- but also three-dimensional flows. However, a numerical instability on a stationary shock wave, so-called carbuncle phenomenon is well known and still a painful problem for shock capturing scheme. Laboratory experiments simulating a stationary shock wave in an accretion flow may directly prove the actual existence of SASI. Some attempts to explore possible laboratory experiment with high-power laser have been conducted by radiation hydrodynamics simulations for observing the SASI growth on the ground. Moreover, three-dimensional simulations for bow-shock instability have been performed and may help the design of the laboratory experiment and understanding the mechanism of SASI.

Naofumi Ohnishi
Department of Aerospace Engineering, Tohoku University

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