

Abstract Submitted
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DNS of Shock / Isotropic Turbulence Interaction¹ NATHAN GRUBE, University of Maryland, ELLEN TAYLOR, PINO MARTÍN, University of Maryland — We discuss DNS of Shock / Isotropic Turbulence Interactions (SITI). We vary the incoming turbulence Mach number up to 0.8 and the convective Mach number up to 5 in order to determine their effects on the interaction. These cases are challenging due to the presence of shocklets in the incoming turbulence as well as significant motion of the main shock. Shock-capturing must be used at all points while still maintaining low enough numerical dissipation to preserve the turbulent fluctuations. We use the linearly- and nonlinearly-optimized Weighted Essentially Non-Oscillatory (WENO) method[1,2]. Particular attention is paid to the inflow boundary condition, where we find the use of snapshots of “frozen” turbulence from decaying isotropic box simulations to be unsatisfactory. We instead use time-varying inflow data generated by a separate forced isotropic turbulence simulation with a specified convection speed. This allows us to access flow conditions where the assumptions of Taylor’s Hypothesis are not met.

- 1.) Martín, M.P., Taylor, E.M., Wu, M., and Weirs, V.G., JCP 220(1) 270-89, 2006.
- 2.) Taylor, E.M., Wu, M., and Martín, M.P., JCP 223(1) 384-97, 2007.

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