

Abstract Submitted
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Interaction of a converging shock wave with isotropic turbulence¹

ANKIT BHAGATWALA, SANJIVA LELE, Stanford University — Simulations of converging spherical shock waves propagating through a region of compressible isotropic turbulence (Taylor scale $Re = 100$, $Mt = 0.6$) are carried out. Parametric variation with respect to initial shock Mach number is studied. Both converging and reflected phases of the shock are studied. Vorticity and turbulent kinetic energy are amplified due to passage of the shock. The vorticity-dilatation term is primarily responsible for the observed behavior. This is confirmed through Eulerian and Lagrangian statistics. Transverse vorticity amplification is compared with linear planar shock turbulence theory. The smallest eddies, represented by the Kolmogorov scale, decrease in size after passing through the converging shock. Distortion of the shock due to turbulence is also investigated and quantified. Turbulence also affects maximum compression achieved at the point of shock reflection, when the shock radius is at a minimum.

¹DOE-SciDAC project, Argonne National Labs

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