Abstract Submitted
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**Effects of shock structure on temperature field in compressible turbulence** QIONGLIN NI, SHIYI CHEN, College of Engineering, Peking University, Beijing 100871, China — Effects of shock structure on temperature in compressible turbulence were investigated. The small-scale shocklets and large-scale shock waves were appeared in the flows driven by solenoidal and compressive forcings, i.e. SFT & CFT, respectively. In SFT the temperature had Kolmogorov spectrum and ramp-cliff structures, while in CFT it obeyed Burgers spectrum and was dominated by large-scale rarefaction and compression. The power-law exponents for the p.d.f. of large negative dilatation were -2.5 in SFT and -3.5 in CFT, approximately corresponded to model results. The isentropic approximation of thermodynamic variables showed that in SFT, the isentropic derivation was reinforced when turbulent Mach number increased. At similar turbulent Mach number, the variables in CFT exhibited more anisentropic. It showed that the transport of temperature was increased by the small-scale viscous dissipation and the large-scale pressure-dilatation. The distribution of positive and negative components of pressure-dilatation confirmed the mechanism of negligible pressure-dilatation at small scales. Further, the positive skewness of p.d.f.s of pressure-dilatation implied that the conversion from kinetic to internal energy by compression was more intense than the opposite process by rarefaction.

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