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DNS study on shock/turbulence interaction in homogeneous isotropic turbulence at low turbulent Mach number KENTO TANAKA, TOMOAKI WATANABE, KOJI NAGATA, AKIHIRO SASOH, YASUHIKO SAKAI, Nagoya Univ, TOSHIYUKI HAYASE, Tohoku Univ, NAGOYA UNIV COLLABORATION — The interaction between homogeneous isotropic turbulence and normal shock wave is investigated by direct numerical simulations (DNSs). In the DNSs, a normal shock wave with a shock Mach number 1.1 passes through homogeneous isotropic turbulence with a low turbulent Mach number and a moderate turbulent Reynolds number. The statistics are calculated conditioned on the distance from the shock wave. The results showed that the shock wave makes length scales related to turbulence small. This effect is significant for the Taylor microscale defined with the velocity derivative orthogonal to the shock wave. The decrease in the Kolmogorov scale is also found. Statistics of velocity derivative are found to be changed by the shock wave propagation. The shock wave causes enstrophy amplification due to the dilatation/vorticity interaction. By this interaction, the vorticity components parallel to the shock wave is more amplified than the normal component. The strain rate is also amplified by the shock wave.

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