Abstract Submitted
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**DNS of the thermal effects of laser energy deposition in isotropic turbulence**[1] SHANKAR GHOSH, KRISHNAN MAHESH, University of Minnesota — Laser energy deposition in isotropic turbulence is studied using DNS. A spectral numerical method is combined with shock-capturing and numerical challenges faced are discussed. A model problem involving energy deposition near a single vortex is studied as a first step. For the turbulent problem, $Re_\lambda = 30$ and $M_t = 0.001$ and 0.3 are considered. Evolution of the mean flow is divided into shock formation, shock propagation and core roll up stages. For $M_t = 0.3$, the turbulence slows down shock formation and propagation and prevents core roll up. This behavior is not observed for $M_t = 0.001$. The turbulence intensities are enhanced due to compression from the shock wave and suppressed due to expansion in the core. Turbulent kinetic energy budgets are computed to explain this behavior. Effect of mean vorticity production on the turbulence is also studied. As an application, laser energy deposition near a wall is studied. Orientation of the laser axis and distance of the focal volume from the wall are found to affect the evolution of the resulting flow field.

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