Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

**Numerical simulation of the thermal effect of a laser–induced plasma on isotropic turbulence**[1] SHANKAR GHOSH, KRISHNAN MAHESH, University of Minnesota — The interaction of a laser–induced plasma with isotropic turbulence is studied using numerical simulations. The simulations use air as the working fluid and assume local thermodynamic equilibrium. The numerical method is fully spectral and uses a shock capturing scheme in a corrector step. Turbulent Reynolds number $Re_\lambda = 30$ and fluctuation Mach numbers $M_t = 0.001$ and 0.3 are considered. $M_t$ of 0.001 is chosen to correspond to low speed experiments (e.g. Comte–Bellot and Corrsin 1971). Here, the shock wave propagates on a much faster time–scale compared to the turbulence evolution. The turbulence ahead of the shock is therefore almost frozen. At $M_t$ of 0.3 the time–scales of the shock wave are comparable to that of the background. In both cases, the mean flow has a significant effect on the turbulence. The effect of the turbulence on the time scale of shock formation and the shock velocity and distortion is studied. The turbulence experiences strong compression due to the shock wave and strong expansion in the core. Turbulence intensities are enhanced and suppressed due to the effects of compression and expansion respectively. This behavior is spatially inhomogeneous and non–stationary in time. Spatial and one–point temporal statistics are discussed. Also kinetic energy budgets are computed and will be discussed.

[1]Project supported by Air Force Office of Scientific Research.

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Date submitted: 04 Aug 2008

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