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**The Effects of Streamwise Expansive Straining on Weakly Compressible Isotropic Turbulence**[1] SAVVAS XANTHOS, MINWEI GONG, YIANNIS ANDREOPOULOS, City College of CUNY — The response of homogeneous and isotropic turbulence to streamwise straining action provided by planar expansion waves has been studied experimentally in the CCNY Shock Tube Research Facility. The reflection of a propagating shock wave at the open end wall of the shock tube generated an expansion fan traveling upstream and interacting with the induced flow behind the incident shock wave which has gone through a turbulence generating grid. A custom made hot-wire vorticity probe was used capable of measuring the time-dependent highly fluctuating three dimensional velocity and vorticity vectors, in non-isothermal and inhomogeneous flows. The longitudinal size of the straining zone was substantial so that measurements within it were possible. The flow accelerated from a Mach number of 0.23 to about 0.56 a value which is more than twice the initial one. Although the average value of the applied straining was only $S_{11}$=130 $s^{-1}$, the amplitude of fluctuations of the strain rate $S_{11}$ were of the order of 4000 $s^{-1}$ before the application of straining and reduced down by about 2.5 times downstream of the interaction. One of the most remarkable features of the suppression of the turbulence is that this process peaks shortly after the application of the straining where the pressure gradient has a minimum.

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