Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

**Subgrid-scale backscatter after the shock-turbulence interaction**
DANIEL LIVESCU, Los Alamos National Laboratory, ZHAORUI LI, Texas A&M University Corpus Christi — The interaction of a shock wave with isotropic turbulence (IT) represents a basic problem for studying some of the phenomena associated with high speed flows, such as hypersonic flight, supersonic combustion and Inertial Confinement Fusion (ICF). In many practical applications, the shock width is much smaller than the turbulence scales and the upstream turbulent Mach number is modest. In this case, recent high resolution shock-resolved Direct Numerical Simulations (DNS) (Ryu and Livescu, J. Fluid Mech., 756, R1, 2014) show that the interaction can be described by the Linear Interaction Approximation (LIA). By using LIA to alleviate the need to solve the shock, DNS post-shock data can be generated at much higher Reynolds and shock Mach numbers numbers than previously possible. Here, such results are used to investigate the properties of the subgrid scales (SGS). In particular, it is shown that the shock interaction decreases the asymmetry of the SGS dissipation PDF as the shock Mach number increases, with a significant enhancement in size of the regions and magnitude of backscatter.

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Date submitted: 20 Jul 2015 Electronic form version 1.4