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**The convergence of DNS results to the LIA solution in canonical shock-turbulence interaction** JAIYOUNG RYU, DANIEL LIVESCU, Los Alamos National Laboratory — The interaction between isotropic turbulence and a normal shock wave is studied using Direct Numerical Simulations, with all flow scales (including the shock width) accurately solved. The simulation domain is open-ended, in a reference frame where the shock is stationary and turbulence is fed through the inlet. Realistic turbulence is generated in separate stationary isotropic simulations, with background velocity matching the shock speed, to avoid the use of the Taylor hypothesis. The shock Mach numbers range from 1.1 to 2.2 and the microscale Reynolds numbers range from 10 to 50. The vortical mode dominates upstream of the shock and the simulations cover the parameter space from linear inviscid, close to the Linear Interaction Analysis (LIA) limit, to regimes dominated by nonlinear and/or viscous effects. This comprehensive coverage of the parameter space shows, for the first time, that turbulence quantities from DNS converge to the LIA solutions as the shock width becomes thinner than the turbulence scales. In this regime, the shock Mach number becomes the dominant parameter, consistent to the LIA prediction.

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