Abstract Submitted
for the DFD08 Meeting of
The American Physical Society

**Accurate simulations of slowly moving shocks with applications to shock-turbulence interaction.**[1] ERIC JOHNSEN, JOHAN LARSSON, Center for Turbulence Research, Stanford University, SANJIVA K. LELE, Aeronautics and Astronautics, Stanford University — Shock-capturing schemes typically exhibit unsteady behavior in problems in which a shock moves slowly with respect to the grid. Though the nature of the problem is not fully understood, prior work (Jin & Liu, JCP 1996) has shown that numerical diffusion in the density leads to a spike in the momentum for the Euler equations. Furthermore, downstream-propagating oscillations are generated when using approximate Riemann solvers such as Roe or HLL; the magnitude of these oscillations in the momentum can be significant and thus can contaminate the flow downstream of the shock. In the present work, we consider the unsteady nature of this spike in a variety of solvers. In particular, we show that these oscillations are related to the upwinding and that they can be suppressed by specifying appropriate bounds on the wave speeds used in the solver. Present one-dimensional results for the Euler equations show an improved behavior. Extension to multi-dimensional problems including shock-turbulence interaction will be discussed.

[1]This work is supported by DOE SciDAC-2 (Grant DE-FC02-06-ER25787).

Eric Johnsen
Center for Turbulence Research, Stanford University

Date submitted: 06 Aug 2008

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