Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Shock-accelerated gas cylinder: a Mach number study[1] TENNILLE BERNARD, PATRICK WAYNE, CLINT CORBIN, C. RANDALL TRUMAN, PETER VOROBIEFF, The University of New Mexico, SANJAY KUMAR, University of Texas - Brownsville, MICHAEL ANDERSON, Illinoisrocstar LLC —
We present an experimental study of the evolution of Richtmyer-Meshkov instability and secondary instabilities at a nominally cylindrical density interface under the influence of a planar shock wave traveling at Mach numbers from 1.2 to 2.4. Shock acceleration of the heavy gas (SF_6) cylinder creates not only the expected primary instability resulting in the formation of a pair of counter-rotating vortex columns, but also produces a prominent spike-like feature. Secondary instabilities (*e.g.,* shear-driven) then develop in the spike. The spike formation most likely occurs due to shock focusing as the shock passes through the initial conditions. It is noteworthy that secondary instabilities in the spike were first observed numerically, and then their existence was confirmed experimentally using laser-induced fluorescence.

[1]This research is supported by NNSA.

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Date submitted: 03 Aug 2012 Electronic form version 1.4