Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Mixing at shocked interfaces with known perturbations[1] ANDREW COOK, Lawrence Livermore National Laboratory, CHRIS WEBER, RICCARDO BONAZZA, University of Wisconsin, BILL CABOT, Lawrence Livermore National Laboratory — We derive a growth-rate model for the Richtmyer-Meshkov mixing layer, given arbitrary but known initial conditions. The initial growth rate is determined by the net mass flux through the center plane of the perturbed interface immediately after shock passage. The net mass flux is determined by the correlation between the post-shock density and streamwise velocity. The post-shock density field is computed from the known initial perturbations and the shock jump conditions. The streamwise velocity is computed via Biot-Savart integration of the vorticity field. The vorticity deposited by the shock is obtained from the baroclinic torque with an impulsive acceleration. Using the initial growth rate and characteristic perturbation wavelength as scaling factors, the model collapses growth rates over a broad range of Mach numbers, Atwood numbers and perturbation types. The mixing layer at late times exhibits a power-law growth with an average exponent of theta=0.23.

[1]This work was performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344. Additional support was provided to the University of Wisconsin by U.S. DOE Grant No. DE-FG52-06NA26196.

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Date submitted: 31 Jul 2012 Electronic form version 1.4