

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Reacting H₂-O₂ Richtmyer-Meshkov Instability Simulations Using Detailed Chemistry¹ PRAVEEN RAMAPRABHU, NITESH ATTAL, University of North Carolina at Charlotte, SUKESH ROY, Spectral Energies LLC, JAMES GORD, Air Force Research Laboratory — Interaction of a shockwave with a flame enhances supersonic mixing and detonation, and is of importance to the design of supersonic combustors, internal combustion engines and fire safety. The Richtmyer-Meshkov instability plays a significant role in these phenomena. We present numerical results of a reacting Richtmyer-Meshkov instability (RMI) triggered by the interaction of a shock with a sinusoidally perturbed H₂-O₂ diffusion flame. The simulations were performed using a modified version of the astrophysical FLASH code [1]. A detailed H₂-O₂ reaction mechanism [2] coupled with an operator-split, 2nd order PPM method in FLASH was used to investigate the effect of RMI induced mixing on the flame. A parametric study for shock Mach numbers ranging from 1.2-3 over Atwood numbers of 0.4-0.65 was carried out, and the results will be presented. The detailed flame dynamics upon reshock will also be discussed.

[1] B. Fryxell, K. Olson, P. Ricker, F. Timmes, M. Zingale, D. Lamb, P. MacNeice, R. Rosner, J. Truran and H. Tufo, *Astrophys. J., Suppl. Ser.* 131, 273 (2000).

[2] G. Billet, *J. Comput. Phys.* 204, 319 (2005).

¹We acknowledge funding from Spectral Energies LLC.

Praveen Ramaprabhu
University of North Carolina at Charlotte

Date submitted: 02 Aug 2012

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