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**Turbulent non - premixed flames driven by the Richtmyer-Meshkov Instability** HILDA VARSHOCHI, NITESH ATTAL, PRAVEEN RAMAPRABHU, Univeristy of North Carolina at Charlotte — We report on Direct Numerical Simulations of shock-induced mixing between fuel ($H_2$) and Oxidizer ($O_2$) streams separated by a sharp interface and driven by the Richtmyer-Meshkov instability (RMI). The resulting non-premixed flame is dominated by vigorous mixing that is a consequence of deposition of baroclinic vorticity at the interface. Such RMI-driven flames, when properly controlled, could play a decisive role in improving the performance of supersonic combustors such as scramjets. While the majority of past research efforts in this area have focused on the shock-bubble flame interaction, our configuration is fundamentally different and involves a planar shock interacting with a planar interface. This allows for the placement of well-defined, precisely controlled initial perturbations on the planar surface. Furthermore, the interface is statistically homogenous in all directions perpendicular to shock traverse, thus rendering the problem amenable to reduced-order 1D modeling of planar-averaged quantities. From detailed, high-resolution DNS [1], we describe flow and flame characteristics of a repeatedly reshocked turbulent RMI flame. We observe that with each reshock event, fresh deposition of vorticity on the already nonlinear interface greatly enhances mixing and combustion. [1] Attal, N., et al. Comput. Fluids 107 (2015): 59-76.

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