Abstract Submitted
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Large eddy simulations of a bluff-body stabilized hydrogen-methane jet flame TOMASZ DROZDA, REZA SHEIKHI, PEYMAN GIVI, University of Pittsburgh, STEPHEN POPE, Cornell University — Large eddy simulation (LES) is conducted of the turbulent bluff-body stabilized hydrogen-methane flame as considered in the experiments of the Combustion Research Facility at the Sandia National Laboratories and of the Thermal Research Group at the University of Sydney [1]. Both, reacting and non-reacting flows are considered. The subgrid scale (SGS) closure in LES is based on the scalar filtered mass density function (SFMDF) methodology [2]. A flamelet model is used to relate the chemical composition to the mixture fraction. The modeled SFMDF transport equation is solved by a hybrid finite-difference (FD) / Monte Carlo (MC) scheme. The FD component of the hybrid solver is validated by comparisons of the experimentally available flow statistics with those predicted by LES. The results via this method capture important features of the flames as observed experimentally.
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[2] F. A. Jaberi, P. J. Colucci, S. James, P. Givi, and S. B. Pope. Filtered mass density function for large eddy simulation of turbulent reacting flows. *J. Fluid Mech.*, 401:85–121, 1999.

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