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Assessment of flame/kinetic models through detailed comparisons with experiment JEFFREY BERGTHORSON, PAUL DIMOTAKIS, California Institute of Technology — Planar premixed flames are stabilized in the stagnation flow field of an impinging jet. Methane, ethane, and ethylene premixed flames are studied experimentally as a function of stoichiometry and imposed strain rate. Simultaneous measurements of axial velocity and CH radical concentration profiles are made using Particle Streak Velocimetry (PSV) and Planar Laser Induced Fluorescence (PLIF). Stagnation-wall temperature and inlet mixture-composition data are acquired concurrently and permit a full specification of the wall and inflow boundary conditions. Experimental results are simulated numerically using the Cantera reacting-flow package in terms of a one-dimensional formulation and a multi-component transport model. Simulated velocity profiles are corrected for particle inertia, thermophoretic, and finite particle-track time-interval effects and allow direct comparisons with experiment. Measured versus predicted velocity and CH profile comparisons allow the validity of flow, transport, and kinetic models for methane, ethane, and ethylene flames to be assessed.

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