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Direct numerical simulation of turbulent autoigniting flames RAJAPANDIYAN ASAITHAMBI, KRISHNAN MAHESH, University of Minnesota — A density based method for DNS/LES of compressible chemically reacting flows is proposed with an explicit predictor step for advection and diffusion terms, and a semi-implicit corrector step for stiff chemical source terms. This segregated approach permits independent modification of the Navier-Stokes solver and the time integration algorithm for the chemical source term. The numerical details are briefly summarized and results from autoigniting non-premixed flames in vitiated coflow with different fuels are discussed. We perform a direct numerical simulation of a turbulent round hydrogen jet at a Reynolds number of ∼12,500 injected into coflowing hot air. Flow statistics and the physics of the flame ignition and stabilization will be discussed.

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