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LES Simulations of Pulsed Gas Jets. JONATHAN ANDERS, Purdue University, VINICIO MAGI, Purdue University, JOHN ABRAHAM, Purdue University — The study of pulsed jets is motivated by their applications which include increasing mixing, enhancing heat transfer, and controlling flow separation and vortex structures. This work investigates the interaction between gas jet pulses in the near-field using large eddy simulation (LES). LES employing the constant coefficient Smagorinsky model is compared to Reynolds-averaged Navier-Stokes (RANS) simulations with a two-equation k-ε model. RANS predictions indicate faster penetration of subsequent jet pulses caused by the mean flow field from the first pulse, and do not show enhanced mixing due to residual turbulence. LES of the jet near-field includes development of the head vortex ring and transition to turbulence in the jet. LES of the pulsed gas jet predicts interaction of the head vortex with residual turbulence from an earlier pulse. The dominant effect of the mean flow field and the accelerated penetration seen in RANS predictions are not evident in the LES results.

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