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Simulation of an ethylene-air jet flame with soot and radiation modeling[1] JEFFREY DOOM, JOSEPH OEFELEIN, Sandia National Laboratories — Large eddy simulation of an ethylene-air diffusion flame and supporting direct numerical simulations are presented. A reduced mechanism recently developed by Wang et al. is used (22 species, 107 reactions) and a systematic study is performed which compares the reduced mechanism to the original full mechanism (*USC Mech Version II*: 111 species, 784 reactions). A series of calculations are then validated by comparing results with CHEMKIN, Lignell et al. (*Combust. Flame 2007*) and the premixed experiments from Bhargava & Westmoreland (*Combust. Flame 1998*). The baseline soot model employed is from Leung et al (*Combust. Flame 1991*) and accounts for nucleation, growth, oxidation and coagulation. This model is coupled through source terms as a function of C_2H_2, CO, O_2 and H_2. The first two moments are considered to account for the number density and soot mass per volume. Initially the radiation model assumes an optically thin medium in a manner consistent with Lignell et al. Results associated with the soot model will be presented along with comparisons with experimental data.

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