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Assessment of Droplet Collision Models in Pulsed Sprays GILES BRERETON, FARID ROSHANGHALB, Michigan State University — The electronic control of fuel injectors allows multiple ensembles of the same pulsed spray event to be measured at different locations in the spray, and to be ensemble averaged for data analysis. In this talk, we present experimental laser-diffraction measurements of droplet size distributions in planes through the pulsed spray, at different locations downstream of the regions of primary and secondary breakup. The measured size distribution closest to the injector serves as an initial condition for droplet collision simulations whereas the measured downstream distributions serve as target data. Lagrangian simulations of a population of spherical fuel droplets matching the measured near-injector size distribution and velocity are then carried out using different collision and satellite-droplet-generation models and compared with downstream size-distribution measurements. Collision models which account rationally for the relative vector velocities of colliding droplet pairs yield downstream size distributions in good agreement with measurements whereas 'ad hoc' models and those which assume random collision angles fair poorly.

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