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Auto-Ignition Delay Times and Nozzle Velocity Profiles of an Ethane Jet GERALD FAST, DIETMAR KUHN, ANDREAS G. CLASS, Forschungszentrum Karlsruhe — The direct injection combustion of hydrocarbons in IC engines represents a complex process. To provide a fundamental understanding of individual processes we study an idealized injection process. At current stage our focus is on auto- ignition of gaseous ethane in a transient free jet. The fuel- specific chemical kinetics is coupled to the non-stationary turbulent mixing of fuel and oxidizer. Our experiment provides the input for a theoretical study which aims to predict auto ignition criteria for a prescribed concentration, temperature, pressure and velocity field. We determine the ignition delay times and the progress of the non-stationary ignition in a turbulent flow field in terms of joint probability density functions (JPDF). The test facility provides oxidizer pressures up to 40 bars at 500C temperature. The injection system consists of a high speed valve which injects the fuel gas into the combustion chamber. The pipe outlet is located in the field of view of the windows to admit optical measurements techniques. Present results of ignition delay times and time-resolved velocity profiles measured with LDV are presented. This work was supported by DFG grant SFB-606.

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