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Evolution of a polydispersed spray in heated and in highly turbulent flow FLORIAN MOREAU, RUDY BAZILE, Institut de Mecanique des Fluides de Toulouse - France — This work aims to study experimentally the dispersion and the evaporation of a polydispersed and bi-component spray in highly turbulent and heated flow. A chamber is designed to generate a heated turbulent flow in which two-component droplets are injected. The two components are octane (85%) and 3-pentanone (15%) and are chosen such that the 3-pentanone vapour concentration can be characterized by laser techniques. The experimental setup consists of a vertical channel with optical access. Before the heated air is injected in the channel, it passes through a turbulence generator. The carrier flow is characterized using Laser Doppler Anemometry. The turbulence is shown to have isotropic properties after a distance equal to four times the width of the channel and to have high levels up to 30%. The liquid phase is characterized with Phase Doppler Anemometry which allows to measure the diameter, the longitudinal and the radial velocity of the droplets. The spatial evolution of the diameter probability density function (PDF) and of the rms and mean velocities are obtained. Droplets mass fluxes are also calculated. In the mixture, 3-pentanone is the only component that fluoresces. So the vapour concentration of 3-pentanone in the carrier flow is determined using Laser Induced Fluorescence.

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