Particle shadow velocimetry technique application for two-phase flow study

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This paper is devoted to the droplet size and velocity measurement PSV (Particle Shadow Velocimetry) technique [1] study and application. High-magnification shadow Imaging is very suitable for visualizing particles, droplets and other structures. The technique is based on high resolution imaging with pulsed backlight illumination. This technique is independent of the shape and material (either transparent or opaque) of the particles and allows to investigate a particle size of 7 µm [2]. Particle size, velocity, concentration, shape and distribution, mass flux can be obtained using PSV technique. This technique is unique and doesn’t have any analogs in Russia. The experimental optical scheme adjustment was realized during the work. A series of experimental researches for disperse characteristics determination and visualization of the aerosol formed by the front-line device of low-emission combustor of gas turbine engine were performed for different modes of operation.

The comparison of results obtained by two measurement techniques was carried out. The first technique is well known developed method of Phase-Doppler Particle Analyzer (PDPA) and the second one is a new and unique PSV technique.

[1] LaVision 2017 3 – 45