

POWERSIGHT SOLID STATE LASER-BASED PDPA SYSTEM

PDPA DATA TAKEN ON AN AGRICULTURAL SPRAY

APPLICATION NOTE POWERSIGHT-002

Data was taken using the PowerSight Solid State Laser-Based LDV/PDPA System from TSI Incorporated on an agricultural spray nozzle. The spray nozzle can be seen in fig. 1.

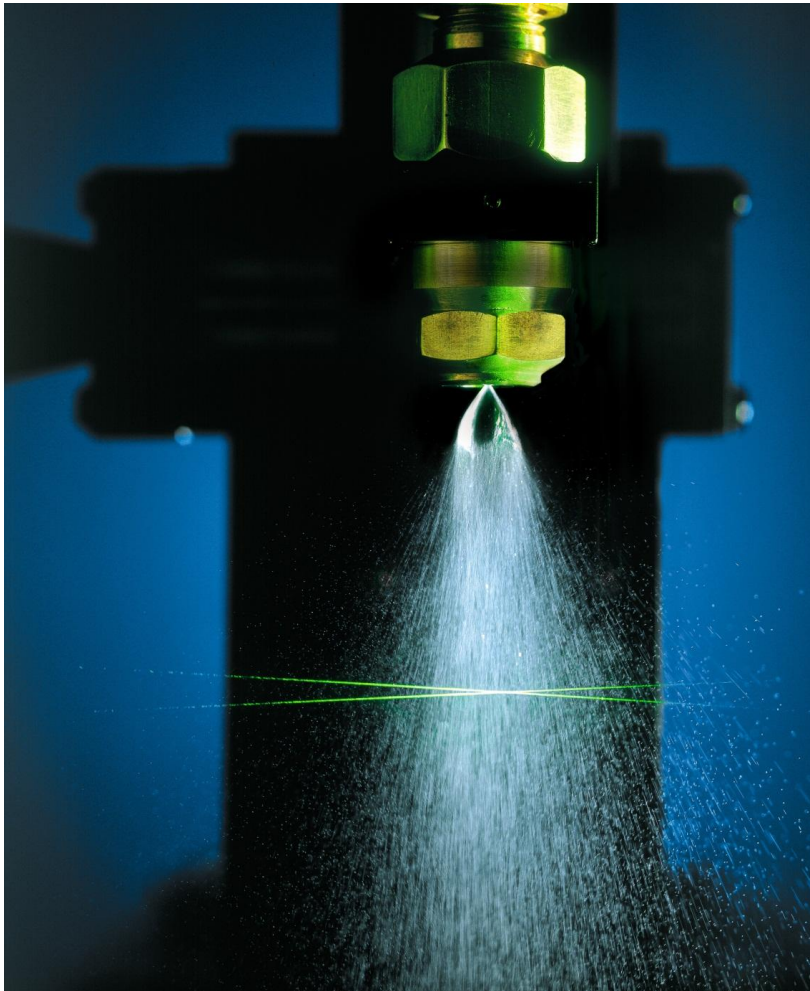


Fig. 1. Image showing the PDPA beams crossing in the spray downstream of the nozzle.

The 2-component PowerSight system was aligned on the center of the spray approximately 40 mm downstream of the nozzle exit in a forward scatter configuration with the receiver aligned at 30 degrees from pure forward scatter. Intensity validation was enabled in order to eliminate incorrect sizing measurements due to such factors as multiple droplets in the measurement region at one time, mixed-mode light scattering, and diameter biased data outside of the $1/e^2$ region of the measurement volume.



Screenshots showing the relevant optical parameters for the experiment can be seen in fig. 2.

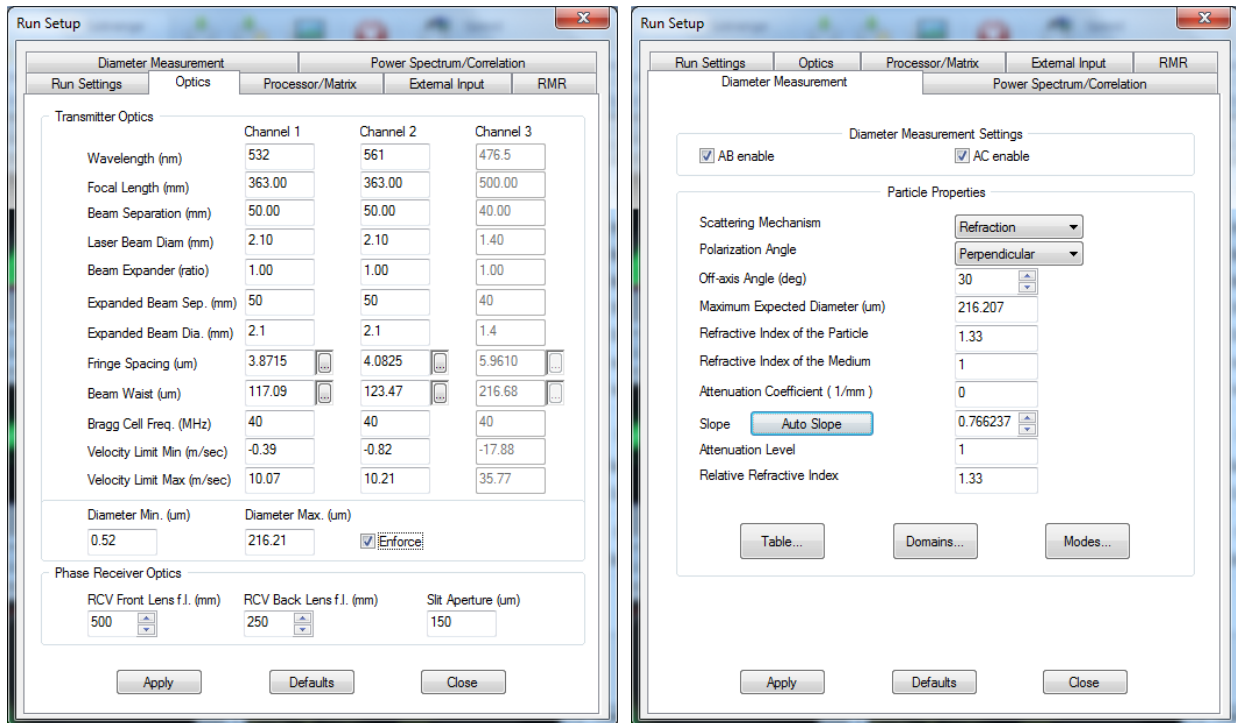


Fig. 2. Relevant optical parameters from the experiment.

The d_{10} with probe volume correction enabled was 90.22 microns, with the d_{32} of 106.61 microns. The spray velocity mean was 3.8 m/s.

A screenshot of the dataset can be seen in Fig. 3.

The diameter distribution and volume distribution exhibit a fit consistent with a normal distribution. The Normal distribution function is based on processes that are random in nature and where no specific bias is present.

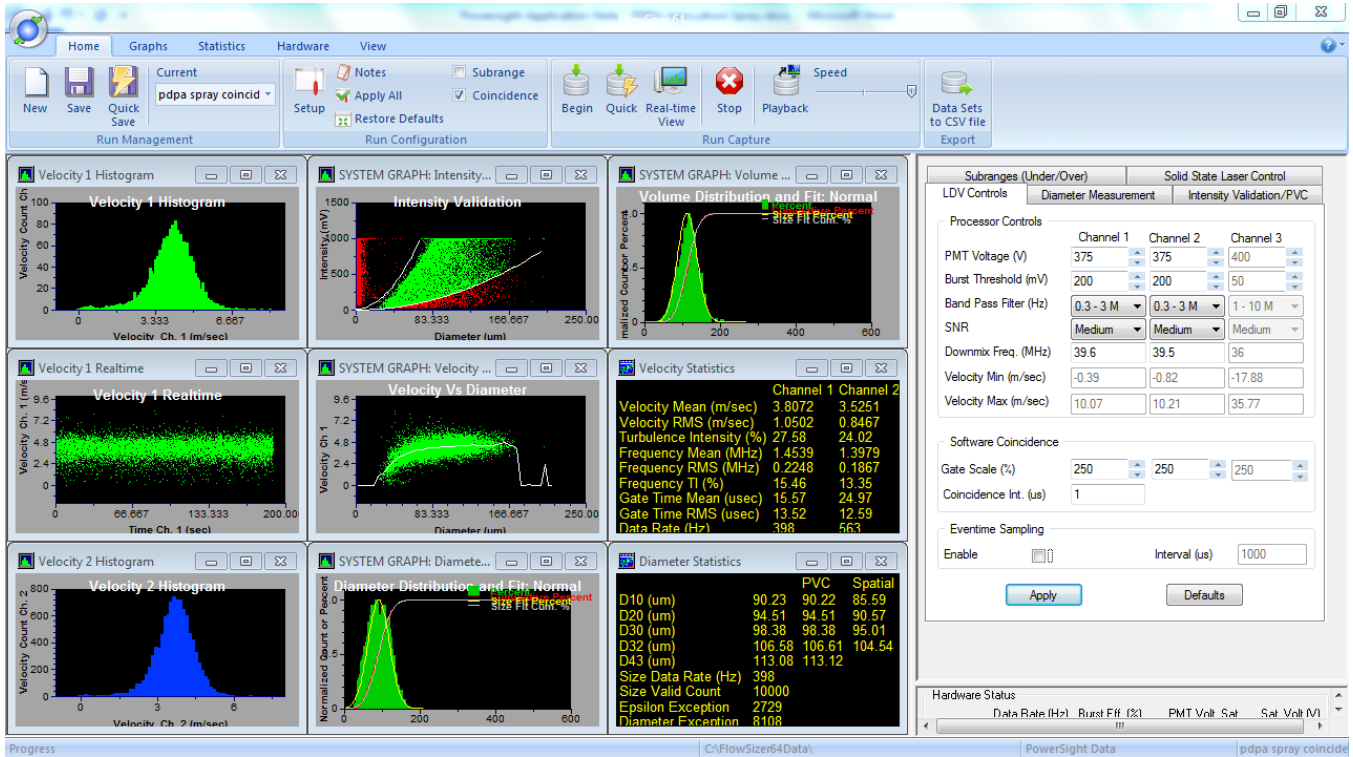


Fig. 3. A screenshot from the dataset taken of the spray nozzle.



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