

# Measurement of drops with inclusions using rainbow refractometry and time-shift technique

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Characterization of drops with inclusions is of great practical interest and has wide industrial applications, for instance spray drying or paint spraying [1]. Reported here is an investigation to simultaneously measure the key parameters (i.e., droplet size, liquid refractive index, drop velocity and inclusion concentration) of a drop with inclusions using rainbow refractometry [2] and the time-shift technique [3].

In this work, a piezoelectric monodisperse droplet generator generates a stream of water drops with a size of 70–200  $\mu\text{m}$ . Polystyrene particles with a diameter of  $300 \pm 30$  nm are dispersed in the distilled water with different concentrations by controlled dilution [4]. With rainbow refractometry the concentration of inclusions can be estimated from the intensity extinction of the rainbow peak and with the time-shift technique an intensity ratio of reflected light to refracted light is employed. Experimental results will be compared with simulated results obtained using a Monte Carlo ray tracing approach [3,5].

## References

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