

Abstract

Development of a Confocal Laser Doppler Flowmeter Using Optical Feedback Interferometry Techniques [†]

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We are presenting a novel confocal laser Doppler flowmeter based on optical feedback interferometry. The system determines the Doppler shift occurring in an 830 nm laser diode when a small portion of the emitted light is back-reflected into the laser cavity after interacting with the particles of an emulsion flowing into a capillary; this second field modulates the laser emission and the changes in the optical output power are used to determine the Doppler frequency regarding the flow velocity. The confocal setup employs a diaphragm to delimit the beam diameter and reduce the phase noise and the out-of-focus particle effect, allowing real-time measurements of the velocity at which the particles are flowing in a very specific region inside the capillary. We demonstrate the benefits of this technique comparing the Doppler spectrum obtained without the confocal arrangement against a confocal measurement.

Conflicts of Interest: The authors declare no conflict of interest.



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