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## Measurement

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# Measurement of water flow rate in microchannels based on the microfluidic particle image velocimetry

Haoli Wang <sup>a, b</sup> ... Yuan Wang <sup>b</sup>

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## Abstract

With the requests of medical, biological and chemical analyses, measurements for micro- and nano-liter flow rate of flow in microchannels have been the hot points, where great difficulties exist. In recent years, microfluidic particle image velocimetry (micro-PIV), a quantitative, non-intrusive technique for the full field measurement of velocity at microscales, has been developed, and it makes the highly accurate measurement for micro- and nano-liter flow rate realized. In this research, micro-PIV technique is suggested for use in flow rate measurements at microscales. Measurements for the square sectional microchannels with side lengths of 0.8 mm, 0.6 mm and 0.4 mm are presented after obtaining a group of visualized velocities under the conditions of the reference Reynolds number of 100 and 200. The analytical velocity solutions on median plane of square sectional duct are employed in flow rate calculations. Research shows

that micro-PIV technique is a promising method for the flow rate measurement at microscales.



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## Keywords

Flow rate; Microchannel; Microfluidic particle image velocimetry; Velocity at microscales

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