

OPTICAL FLOW METER

Ref. 18-017

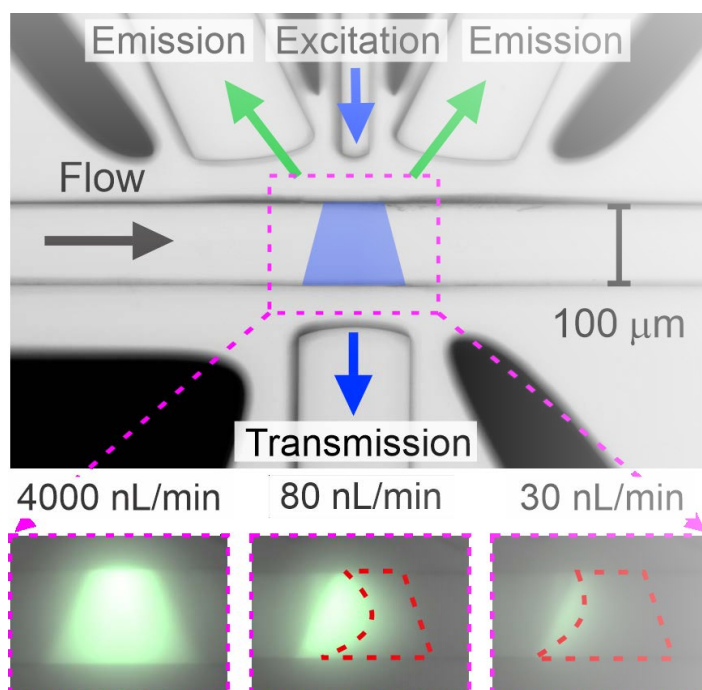
THE TECHNOLOGY

U.S. Patent Number 11,035,707

NIST scientists have developed an optical flow meter that can continuously measure flow in the nanoliter per minute range. Over the instrument's dynamic range, the relative uncertainty in flow rate remains constant and can be controlled to within 5% or better. No existing technology can simultaneously achieve these performance metrics. Moreover, for applications such as leak detection, the instrument can be operated in a secondary mode that detects changes on the order of tens of picoliters per minute about zero flow.

CONTINUOUS & DYNAMIC ADAPTABLE ACCURATE

The invention can be integrated into existing microfluidic technologies as an in situ meter and thus become part of existing microfluidic devices. It could function, for example, as part of a flow control, chemical analysis, or particle /cell measurement system.



Microscope image of 490nm light impinging on a stream of fluorescein (green), which represents the area of measurement through which the activated fluorescein molecules pass. As flow rate decreases, fluorescein bleaches as it moves past the laser, resulting in less emitted light

BENEFITS

World's most accurate continuous flow meter in the nanoliter per minute range

Dynamic range can be adjusted across many decades of flow rates

Secondary zero-flow mode's calibration data can be used to increase the dynamic range and decrease uncertainty in other instrumentation

Zero-flow mode also provides a first-of-its kind, high-sensitivity method for leak detection in the picoliter-per-minute range

Adaptable to other applications such as flow cytometry, mass spectrometry, and drug delivery

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