LICENSING OPPORTUNITY: MULTIPLEXED AMPLITUDE MODULATION PHOTOMETER AND PERFORMING MULTIPLEXED AMPLITUDE MODULATION PHOTOMETRY

DESCRIPTION

Problem

Estimating abundance of cancer antigen on individual cells in a blood sample, for example, is difficult due unknown uncertainties of each measurement, as it has previously been impossible to repeat measurements on single particles in flow. Multiple measurements of particles (such as cells) in flow permit uncertainty quantification (thus improving quantification and classification) and measurements of dynamic processes, but collecting multiple measurements requires additional detectors, which makes instruments large and expensive.

Invention

The invention - a multiplexed amplitude modulation fluorometry, is a method of signal generation, acquisition, and analysis that can simultaneously detect and distinguish fluorophores contained on or in many distinct samples separated in space and/or wavelength.

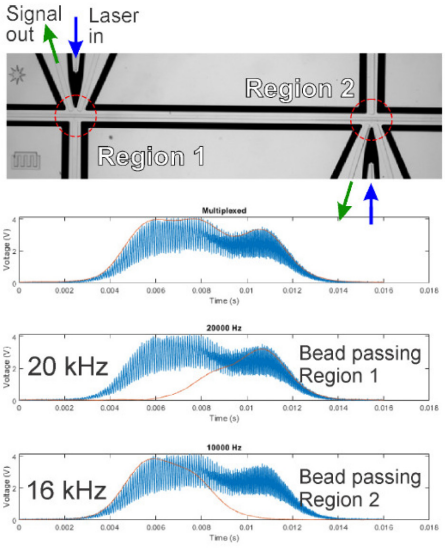
BENEFITS

Commercial Application

Biomedical research, cancer detection, drug development, etc.

Competitive Advantage

Our technique enables multiplexing any number of repeated measurements in time or space to a single detector. The technique reduces or eliminates errors due to misalignment of photodetectors and unknown geometric factors. Moreover, the AC and DC components of any signal carry the same information, so that the method inherently performs repeat measurements at the same location and time. These advances enable reproducibility and reduce complexity of device design (both number of and geometric factors associated with detectors), which are critical to improving the quality and accuracy of biomedical research tools such as flow cytometers.



Demonstration of signal demodulation from spatially separated events collected on a single detector. (PANEL 1) Microscope image of the optofluidic device with two interrogation regions. Blue arrows indicate direction of excitation light from each laser; each region has a unique amplitude modulation frequency. Green arrows indicate fluorescence emission, which is combined into a single waveguide and directed to a photodetector. (PANEL 2) Blue trace shows measured signal for different beads passing through regions 1 and 2 at approximately the same time. Orange trace shows the low pass filtered envelope. (PANEL 3) Demultiplexed signal (orange trace) showing the intensity envelope for the bead passing at region 1, whose laser was modulated at 20 kHz. (PANEL 4) Demultiplexed signal (orange trace) showing the intensity envelope for the bead passing at region 2, whose laser was modulated at 16 kHz.

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