This suffers from several problems. (1) The detector spacing dictates the wavelength center and bandwidth for each channel (if a diffraction grating or prism is used for dispersion) (2) The settings for the detector array do not have the same flexibility in terms of gain and material composition to optimize the signal across all the channels as do the individual detectors (with given gains and peak wavelength sensitivities). Another approach to reducing the space needed for detectors has been to share a single detector to detect the light from multiple interrogation positions. This technique uses the arrival time to assign the signal to the appropriate laser, but also suffers from the problem that the settings must be a compromise between the signals detected across all the lasers and therefore, can suffer from saturation and/or not enough gain in selection of the gain setting. In addition, the sample must be run at low concentration to be sure to not have coincidence (which means that different cells hit different lasers at the same time so that there is signal mixing on the single detector).

SUMMARY

[0005] Methods and systems for implementing single-photon avalanche diodes for flow cytometry are described herein. In one aspect, a computer-implemented method can include receiving one or more light signals at a point in time, wherein each light signal is captured by a respective pixel of a single-photon avalanche diode (SPAD) array, wherein a pixel is activated for a reset time after capturing a light signal; determining a number of activated pixels of the at least one SPAD array during the point in time; and based on the number of activated pixels of the at least one SPAD array for the point in time, adjusting a count of light signals captured by the at least one SPAD array for the point in time. The method can also include relating the count of light signals to a property of a particle from which the light signals were emitted, the particle optionally being a cell. In addition, an assemblage of SPADS can be integrated in a single device with a separation of individual sensors relating to the separation and quantity of the interrogation points in the flow channel.

BRIEF DESCRIPTION OF THE DRAWINGS

[0006] For the purpose of illustrating the invention, there is shown in the drawings a form that is presently preferred; it being understood, however, that this invention is not limited to the precise arrangements and instrumentalities shown.

[0007] FIG. 1 depicts a flow cytometry system according to the present disclosure.

[0008] FIG. 2 depicts a SPAD array according to the present disclosure.

[0009] FIG. 3 depicts a SPAD detector according to the present disclosure.

[0010] FIG. 4 depicts a graph of simulated detection counts for SPAD arrays according to the present disclosure.