

quantiFlash

Calibration Light Source for Cytometry



quantiFlash® Key Facts

- Cytometer calibration with light pulses
- Routine detector / PMT performance test
- Distinguish dim populations from noise
- Calibrate intensity scales to absolute units
- Ideally suited for quality control, service, and development

quantiFlash

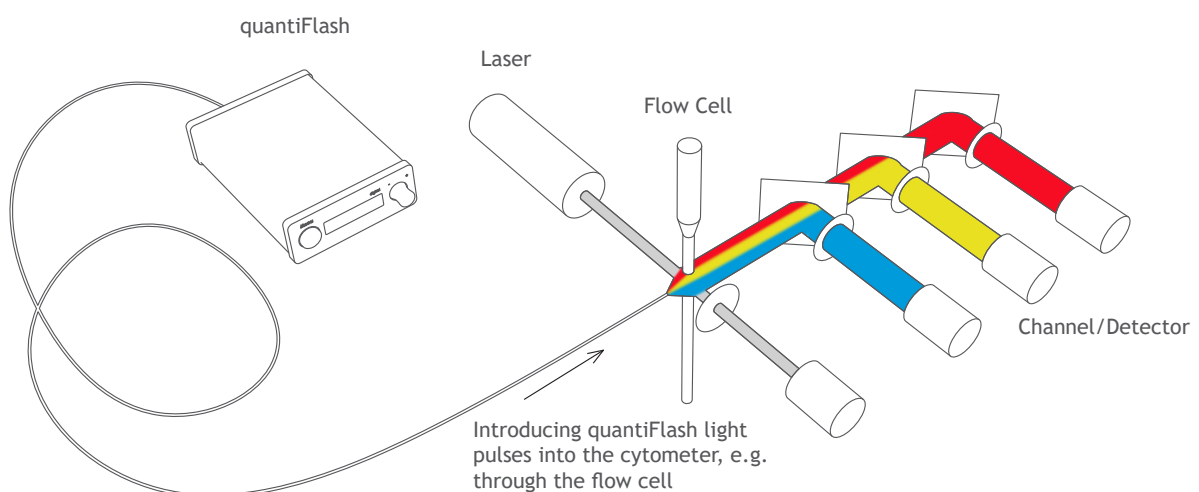
Calibration Light Source for Cytometry

Overview

- quantiFlash - a calibration light source - provides consistent and uniform light pulses that are ideally suited for cytometer calibration. The intensity and duration of the pulses is freely adjustable. In contrast to beads, light pulses have a very small intrinsic coefficient of variation, are stable for any length of time and their quality does not depend on storage conditions.

How quantiFlash works?

- For cytometers the fluorescence beads are primarily a source of light. Light is emitted from a bead as it passes through the laser beam in the focus of the flow cell of the cytometer. As the beads rapidly run through the flow cell, the light they emit is recognized by the detectors as short light pulses.
- quantiFlash produces very precise light pulses over a high dynamic intensity range and with unsurpassed long-term stability. By replacing bead-based light pulses with quantiFlash, you gain robustness and reproducibility in your calibration routines.



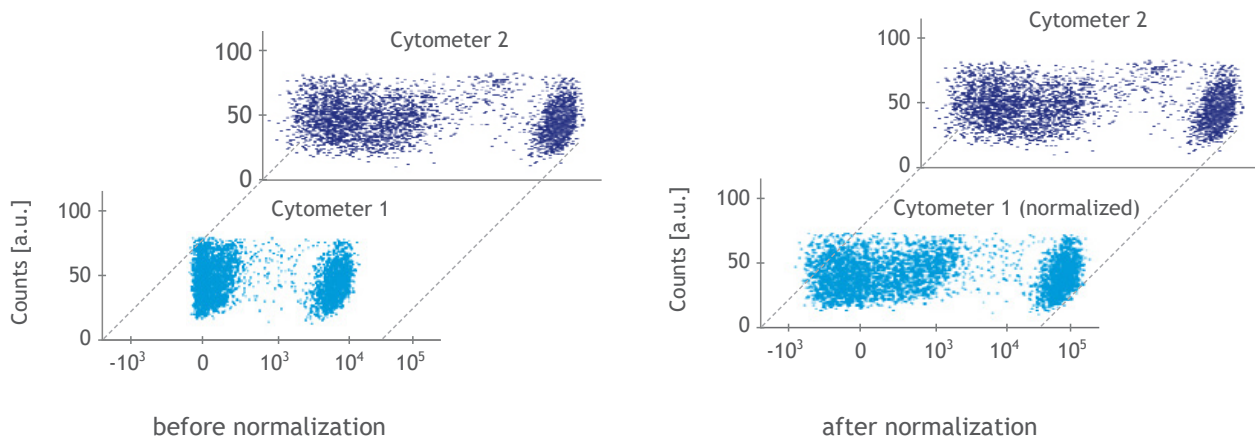
At a Glance

- Photonic scale calibration
- Study effects of pulse shape and pulse duration
- Simulate multi-pulse events and different pulse shapes
- Optimize PMT voltages and test the linearity of detectors
- Detector tests independent of laser alignment and sample preparation

Typical Applications

Comparison and Alignment of Flow Cytometer Results

- quantiFlash makes it possible to calibrate the intensity scale of each channel in a flow cytometer to a meaningful absolute unit, e.g. a standardized photonic scale such as *Spe* (number of detected statistical photoelectrons). This allows direct quantitative comparison between different devices. A calibrated intensity scale makes it possible to transfer measurement results between flow cytometers and therefore improves the comparability of results obtained from different flow cytometers.



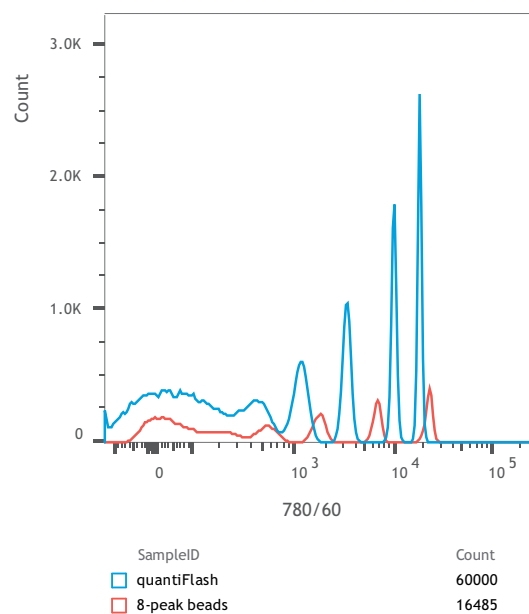
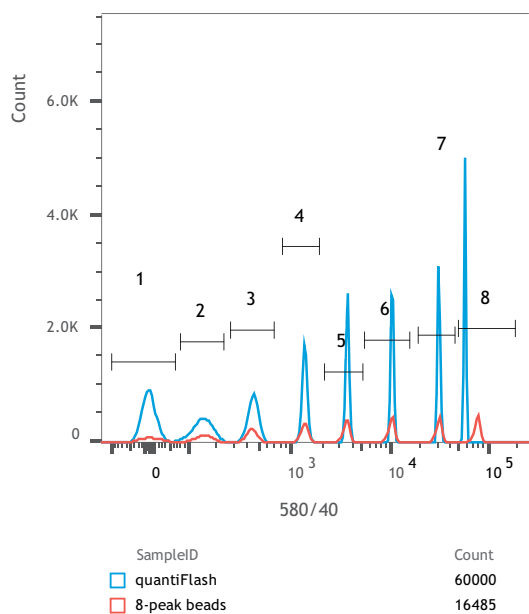
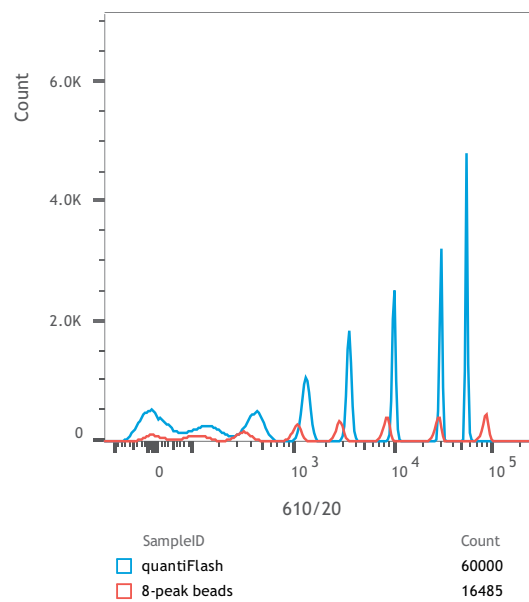
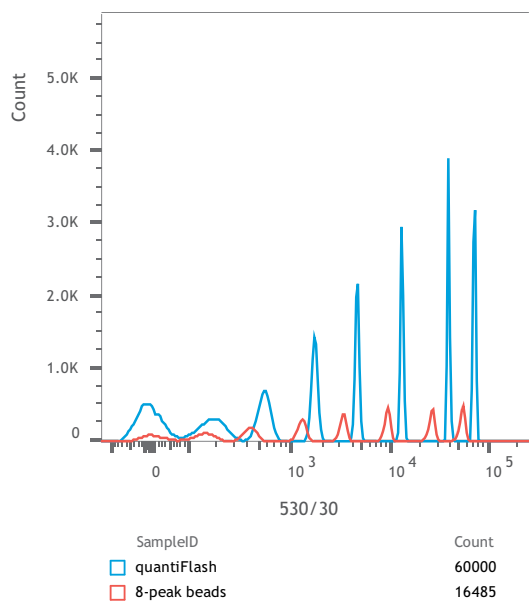
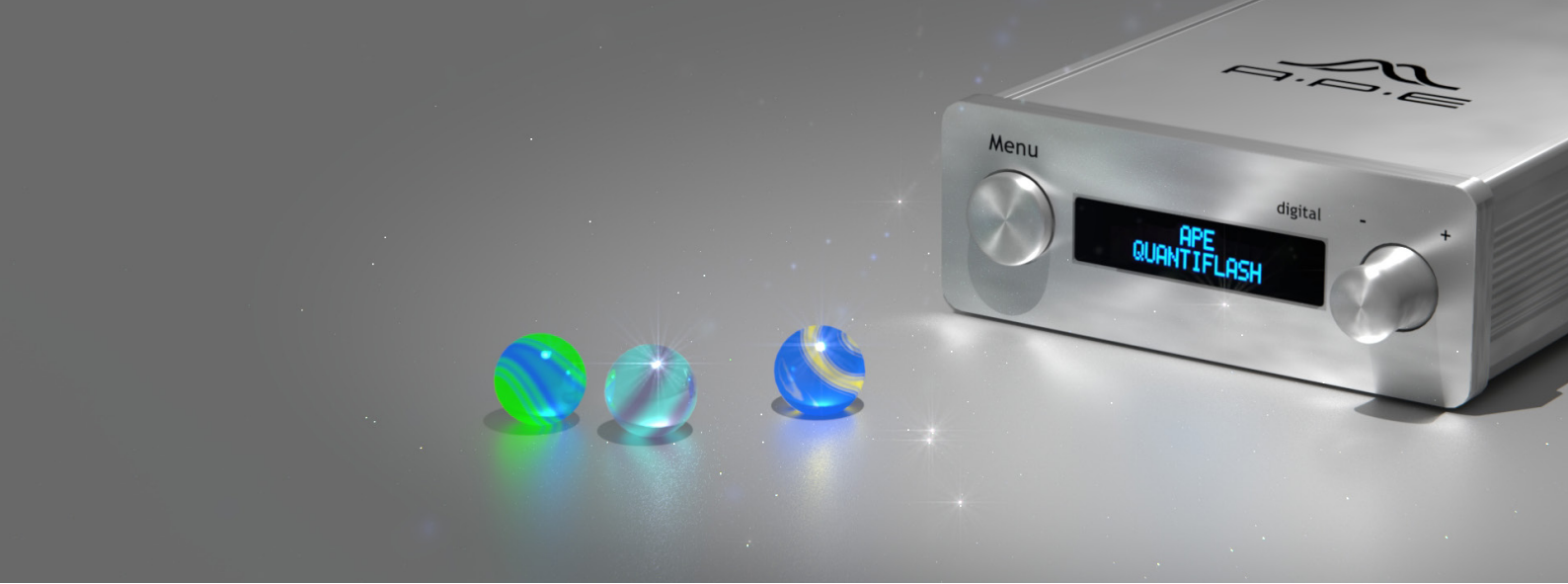
Experiments with Pulse Shapes / Doublet Discrimination / Count Rate Tests

- quantiFlash not only provides Gaussian-shaped single pulses. Other shapes, e.g. flat-top as well as custom shapes, such as double or triple pulses, are available for advanced experiments. The design of custom pulse trains including different pulse combinations is also possible.



Performance Test of PMTs

- The perfect linearity of quantiFlash plus the light intensity range of up to 6 decades is ideally suited to test the performance of PMTs (e.g. signal-to-noise ratio (SNR), dynamic range (DNR), sensitivity), the signal processing, and filter setups. It allows the selection of an optimal voltage/gain setup corresponding to the maximum efficiency of PMTs.



Calibration Protocols

- Standard (bead) calibration protocols as well as specific quantiFlash protocols, e.g. from NIST, can be used with quantiFlash. A list of common protocols can be found on our website.

Accurate Measurements of Q and B

- Light pulses with almost no statistical variations allow for more accurate measurements and calculations of important cytometer parameters, such as Detection Efficiency (Q), Background (B), Statistical Photo-Electrons (Spe), Fluorescence Intensity, Mean Equivalent Soluble Fluorescence (MESF), or Equivalent number of Reference Fluorophores (ERF).

Performance Test of PMTs / Detectors

- The perfect linearity of quantiFlash is ideally suited to evaluate the performance of PMT. The precise adjustment of the delivered light is possible within up to six decades of light intensity.

Low CV

- Negligible statistical variations of $< 0.1\%$ CV of the light pulses outperform traditional calibration methods, e.g. beads or other reference samples.

Widely Compatible

- The quantiFlash principle works with most types of flow cytometers.

Unlimited Peaks

- The number of peaks available with traditional calibration particles is typically limited to 4, 6, or 8. There is no such limitation for quantiFlash.

Unlimited Pulse Shapes

- Different pulse shapes are available, e.g. Gaussian or Flat Top. It is further possible to design customized shapes.

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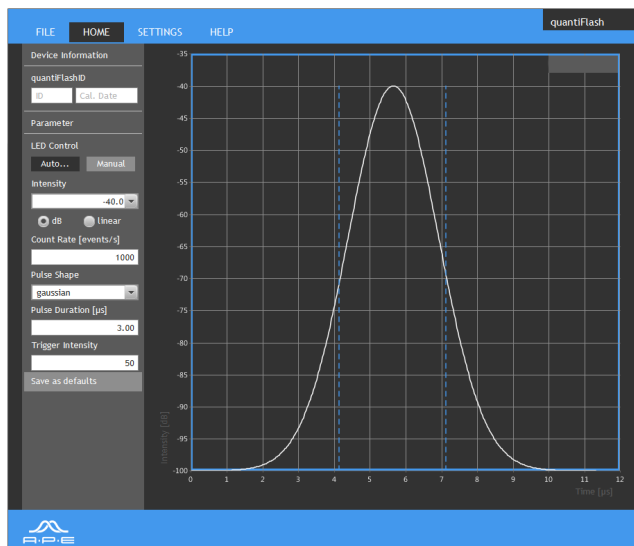
quantiFlash Mounting Kit for BD Available

- quantiFlash comes with 2 fibers. The fiber ends have to be interfaced with the flow cytometer. A dedicated adapter for BD instruments is available from APE, including:

LSR II
FACSAria
FACSCanto
FACSCalibur
LSRFortessa

Software & Software Pro

- An easy to use software interface is part of every quantiFlash. Own automated measurement routines and pulse shapes can be programmed using a Pro software version.



TCP/IP Programming Interface

- A TCP/IP-based standard software interface by APE makes it straight forward to set up remote control and to design custom protocols and experiments.

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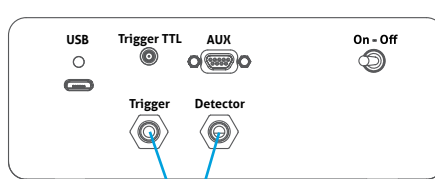
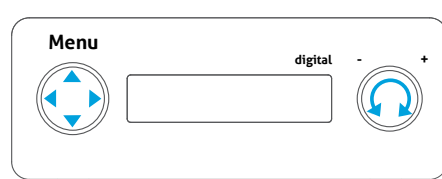
Specifications

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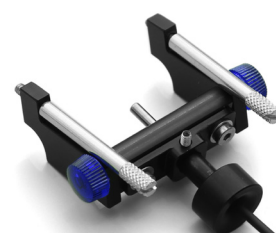
Pulse Duration	1.....10 μ s
	Other versions: up to 100 μ s available
Events (Repetition Rate)	500 Hz 50,000 Hz 100 Hz steps
Repetition Rate Precision	10^{-6}
Pulse Shape	Variable (Gaussian as default)
Pulse Amplitude	0 - 96 dB
Amplitude Precision	< 0.1 % CV
Trigger	Optical and TTL
Fiber Coupling	2 x fibers with f-SMA connector
Options	
	Advanced PC software
	Optical attenuators
	Customized fibers and connectors
	Mounting Kit for BD Instruments

Dimensions and Power

Dimensions	Dimensions 193 x 124 x 48 (L x W x H in mm)
Power	Power Li-ion battery included, rechargeable
	USB powered



Fiber Output



BD Flow Cell Adapter

Your Partner in Ultrafast, Light, Measurement

- Located in Berlin / Germany, APE is a worldwide leading supplier in the field of laser pulse diagnostics and wavelength conversion.
- Our product portfolio includes measurement technology for pulsed light and lasers, optical parametric oscillators (OPOs), optical parametric amplifiers (OPAs), and systems for harmonic generation. Our ultrashort pulse diagnostics line covers autocorrelators for pulse width measurements, spectrometers, and other equipment for measuring and characterizing femtosecond and picosecond laser pulses.



Bead Calibration



Light-pulse Calibration

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