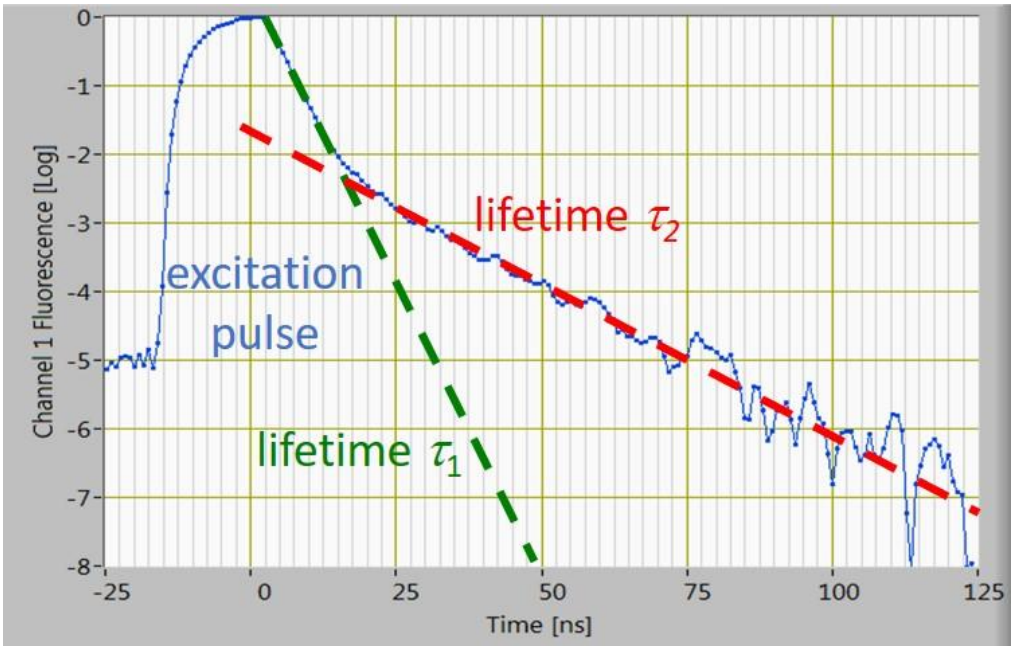
Danube

Fluorescence Lifetime Flow Cytometer

Tech Notes

In cell biology and cancer research, there is often the need to measure cellular processes, protein function, protein-protein interactions, or molecular transport with subcellular resolution. Fluorescence lifetime is a powerful tool that can provide this information. Traditionally, fluorescence lifetime techniques (such as FRET-FLIM) have been carried out on imaging platforms; however, the low throughput of microscopy severely limits the resulting efficiency of analysis.

The ***Danube*** combines many of the benefits of FLIM analysis with the inherent high throughput of flow cytometry. The most advanced **fluorescence lifetime flow cytometer** on the market, it provides **direct**, **time-domain** analysis of fluorescence lifetime, with the ability to measure multi-exponential decay on a cell-by-cell basis at a throughput of up to **1,500 cells/second**.



Danube *measurement of multiexponential fluorescence lifetime decay of a mixture of spectrally overlapping fluorophores with different lifetimes.*

The ***Danube*** works by generating extremely short interactions between the interrogating laser light and the cells in the sample. Each cell is probed hundreds of times, with each excitation event settable between 0.5 and 20 ns. This capability, unique in flow cytometry, results in **subnanosecond time resolution** of fluorescence lifetime decay values, and the ability to measure lifetime changes in most of the fluorophores and fluorescent proteins in common use.

Working directly in the time domain, the ***Danube*** is also capable of simultaneously resolving **multiple lifetime components** within the same cell. This allows the differential quantification of lifetime changes of a given compound in the subcellular environment.

The ***Danube*** brings a new level of performance to cell analysis. By allowing the rapid measurement of subnanosecond lifetime changes across entire cell populations, it gives cell researchers a flexible and efficient new tool for the study of the subcellular environment.

For more information:

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Danube

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Specifications

Excitation Optics

Single-laser options:

- 488 nm (≤ 200 mW)
- 405 nm (≤ 300 mW)
- 640 nm (≤ 150 mW)

Custom laser options (powers vary 50 – 300 mW):

- 375, 395, 420, 445, 460, 473, 505, 515, 633, 660, 685, 785, 850 nm

All sources pulsed at repetition rates 10 – 100 MHz

Emission Optics

Standard channels:

- FSC: 2 – 10°
- SSC: 90°, 1.2 NA
- 488 laser: FL3 (530/30), FL4 (580/30)
- 405 laser: FL1 (430/30), FL2 (470/30)
- 640 laser: FL5 (660/30), FL6 (710/LP)

Custom channel bandpass selections available for each custom laser option

Fluidics

Hydrostatic sheath pressure injection:

- 8-L capacity, pressure up to 30 psig

Hydrostatic sample pressure injection:

- Injection speed: 1 – 100 □L/min

Signal Processing

Digital waveform sampling:

- up to 1.5 GHz bandwidth
- up to 10-bit resolution (raw data)
- up to 2.5 GS/s per channel

Offline signal analysis:

- multiexponential lifetime fit

Performance

Fluorescence lifetime:

- interaction time from 0.5 to 20 ns
- down to 500-ps lifetime resolution
- multiexponential decay

Sensitivity (488-nm excitation, 530/30-nm channel):

- FITC ≤ 1000 MESF (typ.)
- 7/8 Spherotech Rainbow bead peaks
- CV 6% (typ.)

Throughput:

- 1,500 events/s (single channel)

Installation Requirements

Dimensions:

- 24” x 36” x 10” (W x L x H)
  (separate sheath and waste tanks)

Weight:

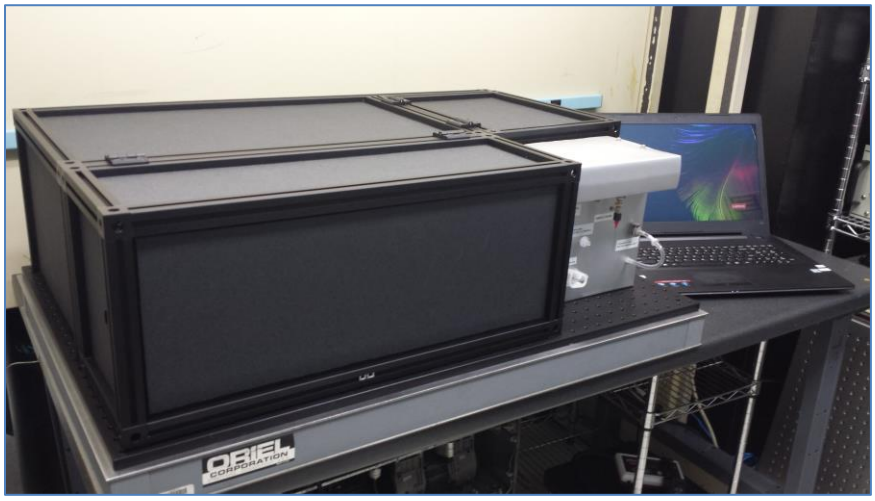
- 160 lbs. (1-laser, 4-detector system)

Environmental:

- 15°–30°C, 60% RH

Power:

- North America: 120 VAC, 50/60 Hz, 5A
- Japan: 100 VAC, 50/60 Hz, 5A
- Rest of world: 230 VAC, 50/60 Hz, 3A



A Danube *fluorescence lifetime flow cytometer*

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