Danube

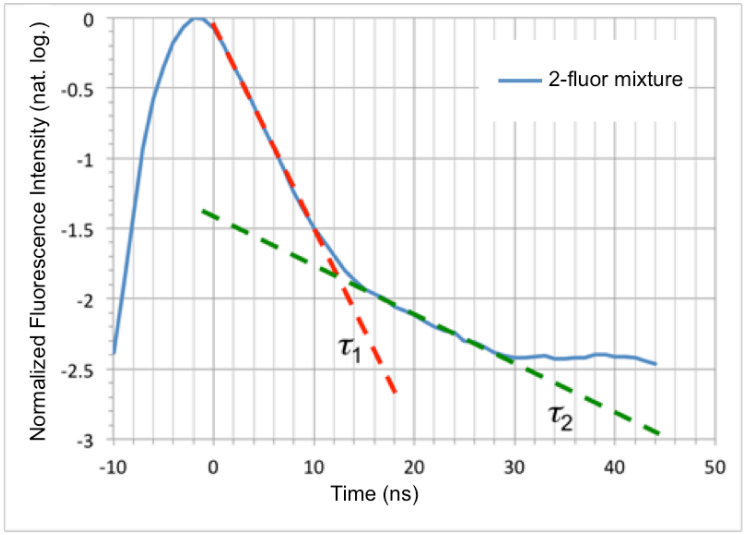
Fluorescence Lifetime Flow Cytometer

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 **5,000 cells/second**.

The ***Danube*** works by generating extremely short interactions between the interrogating laser light and the cells in the sample. Each cell is probed dozens of times, with each excitation event lasting 4 ns or less. 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.



Danube measurement of multiexponential fluorescence lifetime decay of a mixture of PyBlue (τ_1) and a blue-emitting quantum dot (τ_2).

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:
Kinetic River Corp.
+1 (650) 269-0726
info@KineticRiver.com
www.KineticRiver.com
897 Independence Ave. #4A
Mountain View, CA 94043 USA

Danube

Fluorescence Lifetime Flow Cytometer

Technical 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 µL/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:

- down to 4-ns interaction time
- 500-ps lifetime resolution
- multiexponential decay

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

- FITC ≤ 1000 MESF (typ.)
- 5/6 Spherotech Rainbow bead peaks
- CV 6% (typ.)

Throughput:

- 5,000 events/s (typ.)

Installation Requirements

Dimensions:

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

Weight:

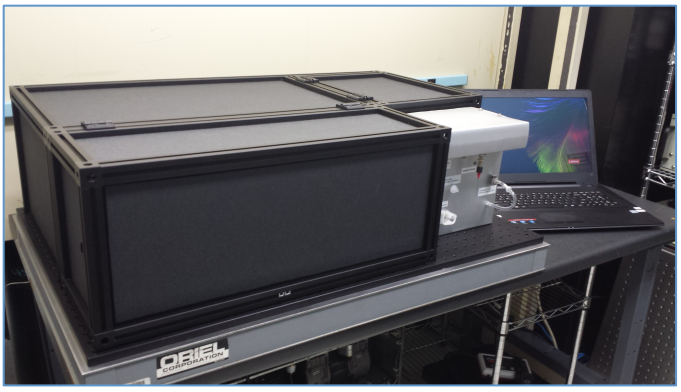
- 160 lbs. (1-laser, 4-detector system)

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



For more information:
Kinetic River Corp.
+1 (650) 269-0726
info@KineticRiver.com
www.KineticRiver.com
897 Independence Ave. #4A
Mountain View, CA 94043 USA