



FASTAC FLIM System

Fast-Acquisition TCSPC FLIM System

Based on bh's multi-dimensional TCSPC technique

Acquisition times down to 100 ms

Peak count rates exceeding 20 MHz

Ultra-high time resolution

IRF width < 25 picoseconds

Time-channel width down to 820 femtoseconds

Images size from 128 x 128 pixels to 2048 x 2048 pixels

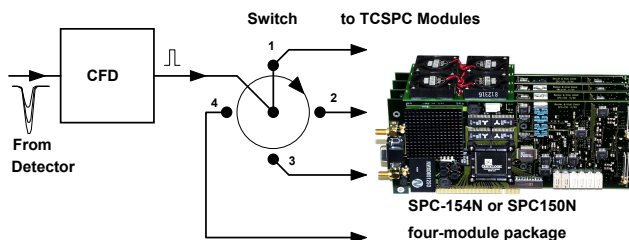
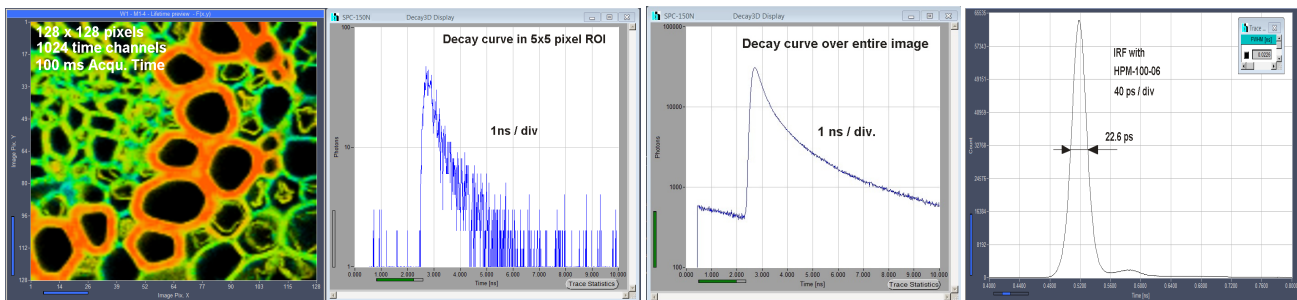
Number of time channels per pixel up to 4096

Upgrade for bh DCS120 laser scanning systems

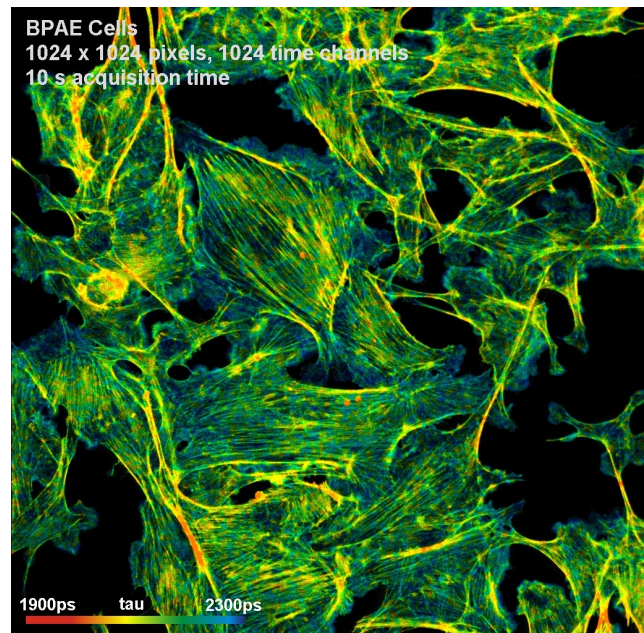
Upgrade for laser scanning system of other manufacturers



The bh Fast-Acquisition FLIM system uses four parallel TCSPC channels and a device that distributes the photon pulses of a single detector into the four recording channels. The system features an electrical IRF width of less than 7 ps (FWHM), and a time channel width down to 820 fs. The optical time resolution with an HPM-100-06 or -07 hybrid detector is shorter than 25 ps (FWHM). The system is virtually free of pile-up effects. FLIM data can be recorded at acquisition times down to the fastest frame times of the commonly used galvanometer scanners. The data are recorded with the TCSPC-typical number of time-channels of up to 4096, and with pixel numbers from 128 x 128 to 2048 x 2048 pixels. The system is therefore equally suitable for fast FLIM and precision FLIM applications [2, 3].



Please see: 'Fast-Acquisition TCSPC FLIM System with sub-25 ps IRF width', Application note, www.becker-hickl.com

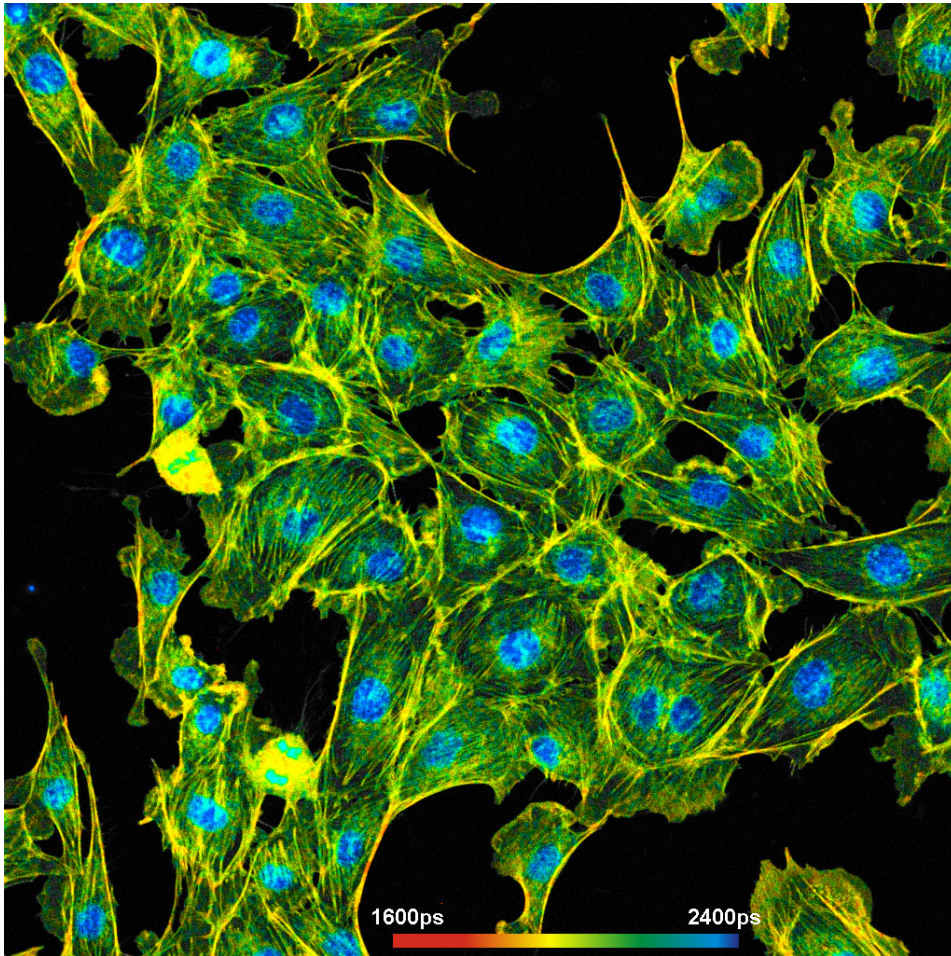


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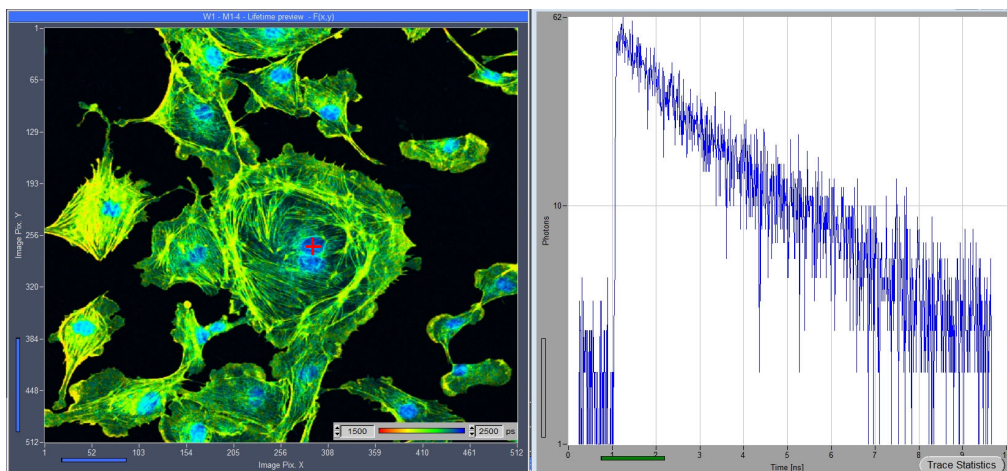
FASTAC FLIM System

Megapixel FLIM within Seconds



BPAC Sample stained with DAPI, Alexa 488 and Mito tracker Red, 2p excitation at 800 nm, Zeiss LSM 880 NLO, 1024 x 1024 pixels, 1024 time channels. Acquisition time 10 seconds

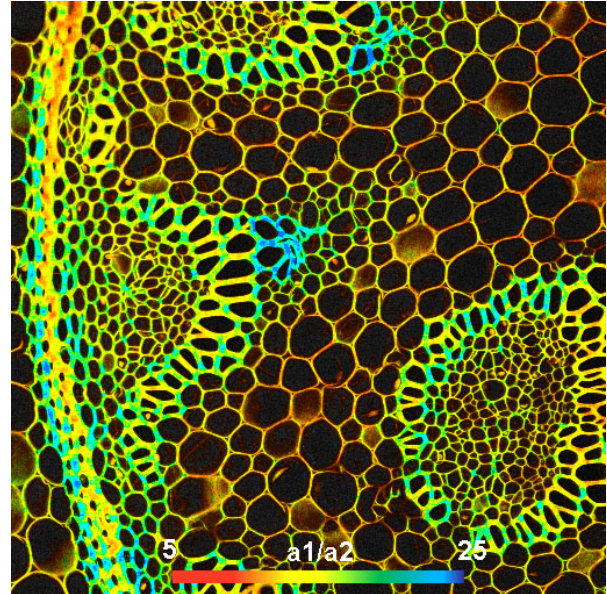
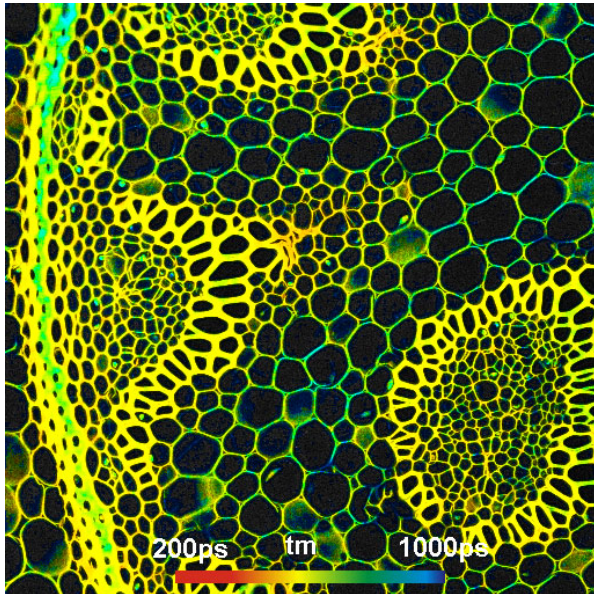
Beautifully Resolved Decay Functions



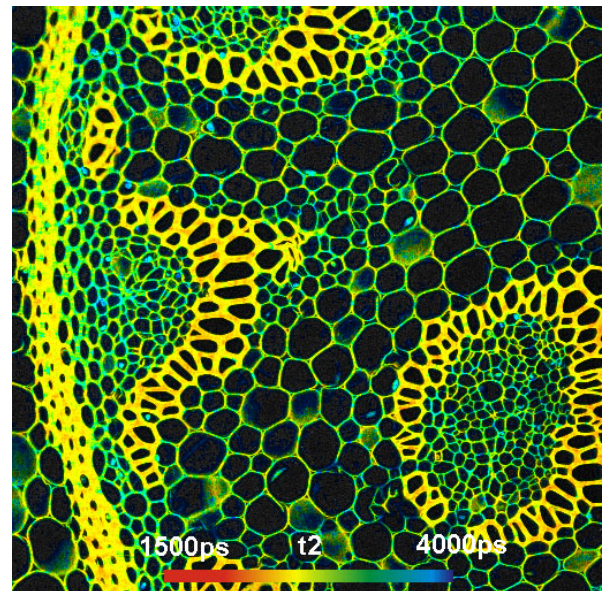
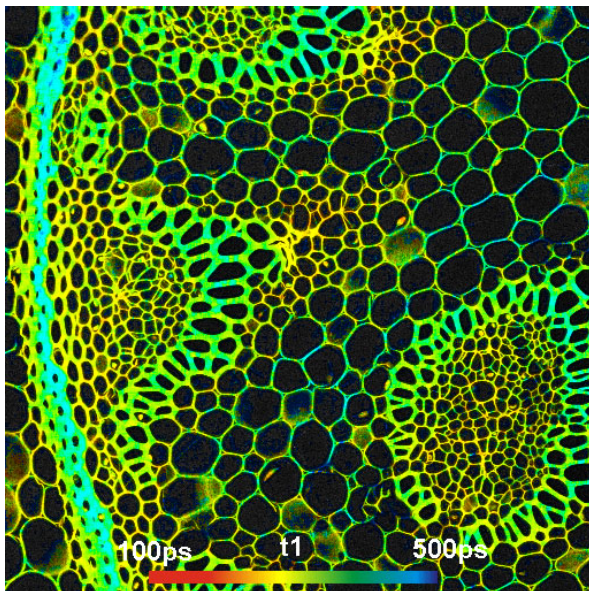
Decay curves resolved with 1024 time channels. Decay curve from 8x8 pixel area around the spot marked in the image. 2p excitation, HPM-100-06 detector. Note the fast rise of the fluorescence, which is a result of the extremely fast IRF of the system.



Resolution of Multi-Exponential Decay Functions



Double-exponential analysis of FASTAC FLIM data by bh SPCImage. Convallaria sample, 2p excitation.
Left: Amplitude-weighted lifetime, t_m . Right: amplitude ratio of decay components, a_1/a_2 . Data recorded with 4 seconds acquisition time.



Left: Lifetime image of fast decay component, t_1 . Right: Lifetime image of slow decay component, t_2 .





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Available FLIM Data Formats:	Pixels	Time Channels, max	Time-Channel width, min.
	128 x 128	4096	813 fs
	256 x 256	4096	813 fs
	512 x 512	4096	813 fs
	1024 x 1024	1024	3.26 ps
	2048 x 2048	256	13 ps

Instrument Response Function (IRF)

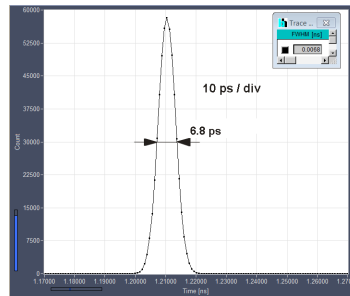
IRF width, FWHM

Electrical	6.9 ps
HPM-100-06 detector	23 ps
HPM-100-07 detector	23 ps
HPM-100-40 detector	130 ps

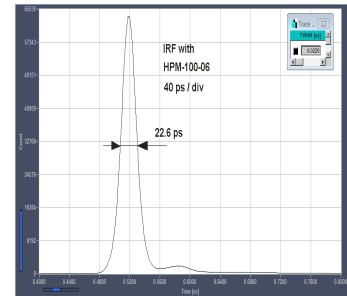
Software version required

Data acquisition, SPCM	April 2018 or later
Data analysis, SPCImage	April 2018 or later

Electrical IRF

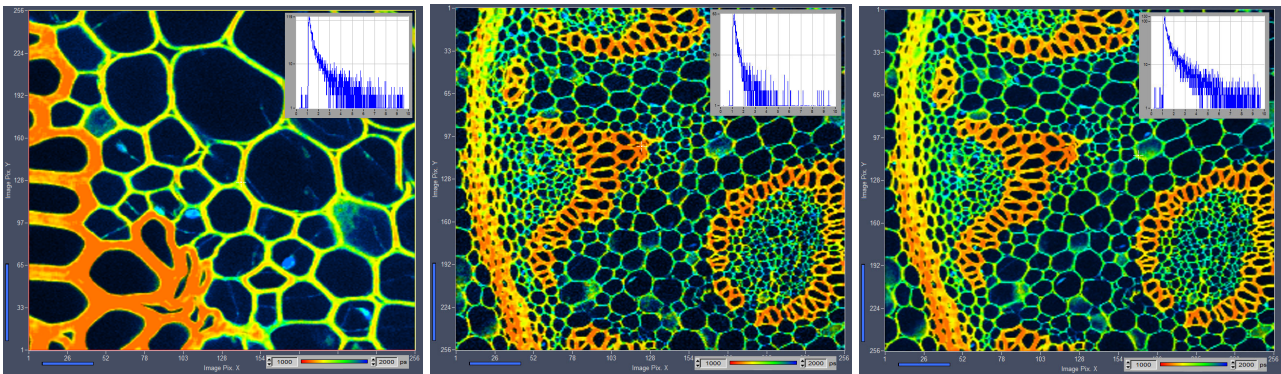


Optical IRF, HPM-100-06 Detector



Acquisition Time

Acquisition time depends on speed of scanner, number of pixels in the image, photon rate delivered by the sample, and on the requirements to the lifetime accuracy. Please see [1] and [5] for details. Examples of images recorded with different acquisition time are shown below.



Images: Left to right: Acquisition time 0.16 s (zoom to obtain short frame time), 0.5 s, 2.5 s. Insert: Decay data in 5x5 pixel area around the cursor position. FLIM data format 256 x 256 pixels, 1024 time channels. Online-lifetime display of SPCM [5].

Related Products

- SPC-150, SPC-150N, SPC-160 TCSPC/FLIM Modules
- HPM-100-06, -07, -40 hybrid detectors
- DSC-120 Confocal and multiphoton laser scanning systems
- DCS-120 Macro System
- FLIM Systems for Zeiss LSM 710 / 780 / 880 Laser scanning microscopes

Literature

- W. Becker, The bh TCSPC Handbook, 7th ed. (2017), available from www.becker-hickl.com
- Fast-Acquisition TCSPC FLIM System with sub 25 ps IRF width. Application note, available from www.becker-hickl.com
- Fast-Acquisition Multiphoton FLIM with the Zeiss LSM 880 NLO. Application note, available from www.becker-hickl.com
- Fast-Acquisition TCSPC FLIM: What are the Options? Application note, available from www.becker-hickl.com
- SPCM Software Runs Online-FLIM at 10 images per second. Application note, available from www.becker-hickl.com

International Sales Representatives



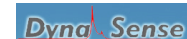
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