FLIM Systems for Laser Scanning Microscopes

Based on bh’s Fast Multi-Dimensional TCSPC Technique

FLIM for Laser Scanning Microscopes of all Manufacturers
Multiphoton NDD FLIM
Confocal FLIM
Upright and Inverted Microscopes

Ultra-high sensitivity
GaAsP hybrid detectors
MCP PMTs
Single-detector systems
Dual-detector systems
Multi-spectral FLIM systems

Simultaneous detection in all wavelength channels
Parallel TCSPC systems for dual-detector systems
High count rate
Short acquisition time
Sequential recording by memory swapping
Time-series FLIM as fast as 2 images / second
Time-tag and histogram modes
FCS recording, online-correlation and fit
Extremely large images by FIFO imaging mode
Fast preview in all FLIM modes

Single, double, triple-exponential decay analysis
Multi-spectral decay analysis
FRET measurement without bleedthrough
Double-exponential FRET: Separation of interacting and non-interacting protein fractions
Autofluorescence of cells and tissue
Ion concentration measurements

Becker & Hickl GmbH
 Nahmitzer Damm 30
 12277 Berlin, Germany
 Tel. +49 30 787 56 32 Fax +49 30 787 57 34
 info@becker-hickl.com www.becker-hickl.com

Covered by patents DE 43 39 784 and DE 43 39 787
FLIM Systems for Laser Scanning Microscopes

Multiphoton NDD FLIM
GaAsP Hybrid detectors
SPAD-like sensitivity combined with deep-tissue imaging capability
Single channel systems
Dual channel systems, fully parallel detection in two wavelength channels

More than 15 years experience in multi-dimensional TCSPC. More than 1300 TCSPC systems worldwide

Multiphoton NDD Multispectral FLIM
The world’s first multiphoton, multispectral NDD FLIM system
Simultaneous detection in 16 wavelength channels
No wavelength scanning, no time gating
Near-ideal recording efficiency

Confocal FLIM
Hybrid detectors: SPAD-like sensitivity
No afterpulsing, no diffusion tail
No alignment needed
Highly efficient FCS from a single detector
Large area, no alignment needed
Efficient collection of light even from large pinholes

Confocal Multispectral FLIM
Simultaneous detection in 16 wavelength channels
Near-ideal recording efficiency
No wavelength scanning, no time gating
Maximum SNR at minimum sample exposure

Time-Series FLIM
Time-series down to 2 images per second
FLIM Systems for Laser Scanning Microscopes

bh Simple-Tau 150, 152, 154 TCSPC FLIM systems
Highly Flexible. Modular. Upgradable. Small and portable. Single channel, dual-channel, four-channel parallel acquisition FLIM. Confocal FLIM, multiphoton FLIM, NDD FLIM, multispectral FLIM, time-series FLIM, FCS. No matter what kind of FLIM, the TCSPC systems are compatible.

bh HPM-100-40 GaAsP hybrid detector modules
SPAD-like sensitivity combined with the large active area of a PMT
High count rate, fast response, no afterpulsing, no diffusion tail. The perfect FLIM detector.

bh PMC-100 and PMZ-100 PMT modules
Small, fast, rugged. The detector that never gets tired.

bh MW FLIM multi-wavelength detector
Detect simultaneously in 16 wavelength channels
Adapters for NDD ports, confocal ports, and fibre ports

bh BDL series picosecond diode lasers
405 nm, 445 nm, 473 nm, 488 nm, 640 nm. Picosecond or CW mode. Free beam or high efficiency single-mode fibre coupling. Point-Source coupler or fibre pigtail. Designed and manufactured in cooperation with LASOS

More than 15 years experience in multi-dimensional TCSPC. More than 1300 TCSPC systems worldwide.
FLIM Systems for Laser Scanning Microscopes

TCSPC Technique (Standard FLIM Systems)

<table>
<thead>
<tr>
<th>TCSPC system</th>
<th>Single-Detector Systems</th>
<th>Dual-Detector Systems</th>
<th>Multi-Spectral Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Components</td>
<td>Simple-Tau 150</td>
<td>Simple-Tau 152</td>
<td>Simple-Tau 150</td>
</tr>
<tr>
<td>IRF width, electrical min. time-channel width</td>
<td>2.5 ps rms / 8 ps fwhm</td>
<td>2.5 ps rms / 8 ps fwhm</td>
<td>2.5 ps rms / 8 ps fwhm</td>
</tr>
<tr>
<td>Saturated count rate</td>
<td>10 MHz</td>
<td>20 MHz</td>
<td>10 MHz</td>
</tr>
<tr>
<td>Sustained count rate</td>
<td>any</td>
<td>any</td>
<td>any</td>
</tr>
<tr>
<td>Scan Sync In mode</td>
<td>4 MHz</td>
<td>4 MHz</td>
<td>4 MHz</td>
</tr>
<tr>
<td>FIFO Imaging Mode</td>
<td>any</td>
<td>any</td>
<td>any</td>
</tr>
<tr>
<td>Scan synchronisation</td>
<td>via pixel clock, line clock and frame clock in all imaging modes</td>
<td>automatic zoom with zoom in microscope</td>
<td></td>
</tr>
<tr>
<td>Online display</td>
<td>in programmable intervals, 1 second or larger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. image size</td>
<td>130 MBytes</td>
<td>260 MBytes</td>
<td>130 MBytes</td>
</tr>
<tr>
<td>MP NDD FLIM</td>
<td>Non-de canned port must be available</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Confocal (VIS) FLIM</td>
<td>Input fibre for laser must be available or pulsed laser must be installed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zoom</td>
<td>automatic zoom with zoom in microscope in all imaging modes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Online display</td>
<td>in programmable intervals, 1 second or larger</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. image size</td>
<td>256x256x1024</td>
<td>256x256x1024</td>
<td>256x256x1024</td>
</tr>
<tr>
<td>Requirements to Microscope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Requirements to Microscope</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other FLIM configurations</td>
<td>Please note that the bh FLIM systems are highly modular. Therefore a large number of different FLIM system configurations are possible. Please see [1] for details or contact bh.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Literature:**


Please contact bh for printed copies