PicoQuant

Luminosa

Explore new paths in confocal microscopy

Vision

We want to assist more scientists to efficiently drive their research forward by using and developing quantitative methods in single molecule and time-resolved fluorescence microscopy.

“Expert tools accessible in an easy and intuitive way.”

Prof. Jörg Enderlein
Georg-August-University Göttingen

Remarkably simple.
Precisely yours.

Luminosa pairs highest data quality with remarkably simple day-to-day operation. It easily integrates into any researcher’s toolbox and becomes a time-efficient, reliable companion for scientists starting to explore the use of time-resolved fluorescence methodologies as well as experts wanting to push the limits.
Truly a microscopy system that everybody can trust.

Quality and precision you can trust

Optimal performance for single molecule investigations in every measurement context: One-click autoalignment procedure even without requiring a sample. Galvo scanning (maximum speed) and objective scanning (maximum photon detection efficiency) on the same microscope.

Save time and simply focus on your samples

Context-based, intuitive workflows guide you to efficiently harness the full power of smFRET, FCS and FLIM with confidence. Get analysis results with minimal user interaction. GPU-based alogrithms provide fast and reliable results.

Advanced flexibility

Adjust the observation volume to match the dynamics of your FCS and smFRET assays with a single click.
An open mode of operation is available for full aceess to every optomechanical component via software.

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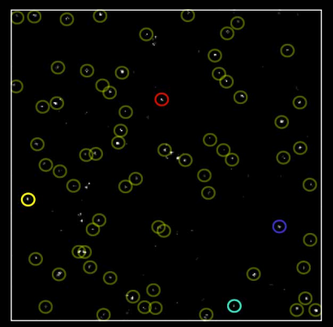
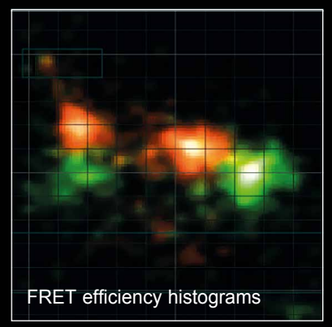
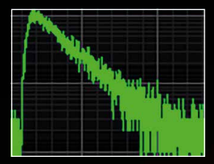
Methods and Applications

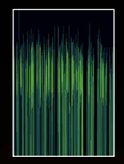
A versatile and accessible toolbox for your research

Luminosa offers access to advanced quantitative methods in single molecule and time-resolved fluorescence microscopy that can be incorporated into your research toolbox in a simple, time efficient and robust manner.

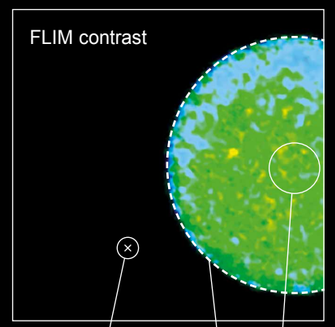


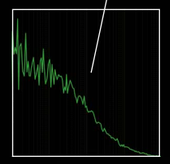


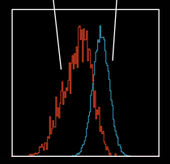




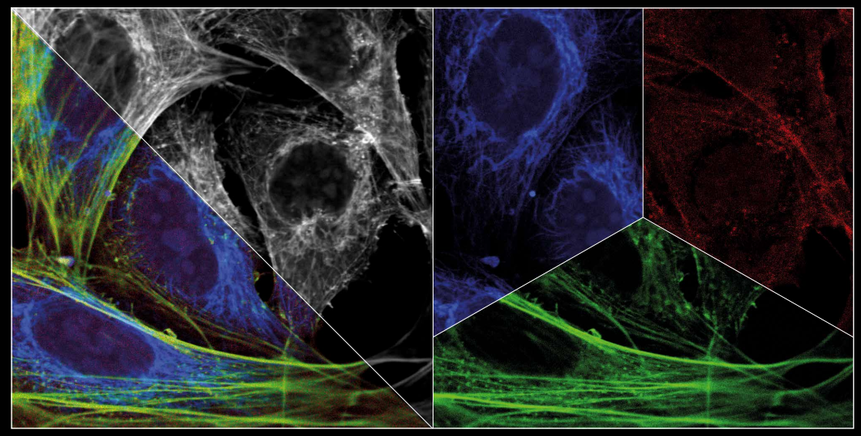
Dynamic structural biology at the single molecule level



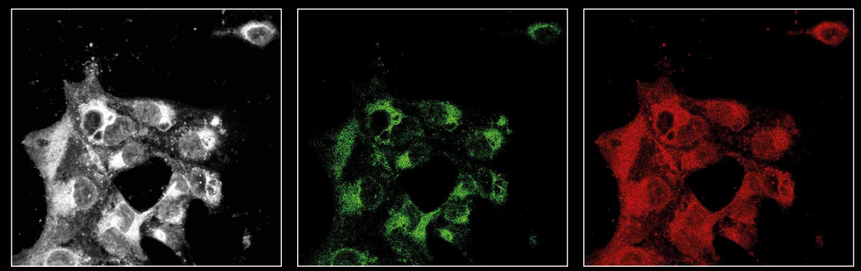




Cellular mechanisms driven by phase-separation



Lifetime based marker separation: 3 markers detected in one spectral channel and seperated by fluorescence lifetime differences.



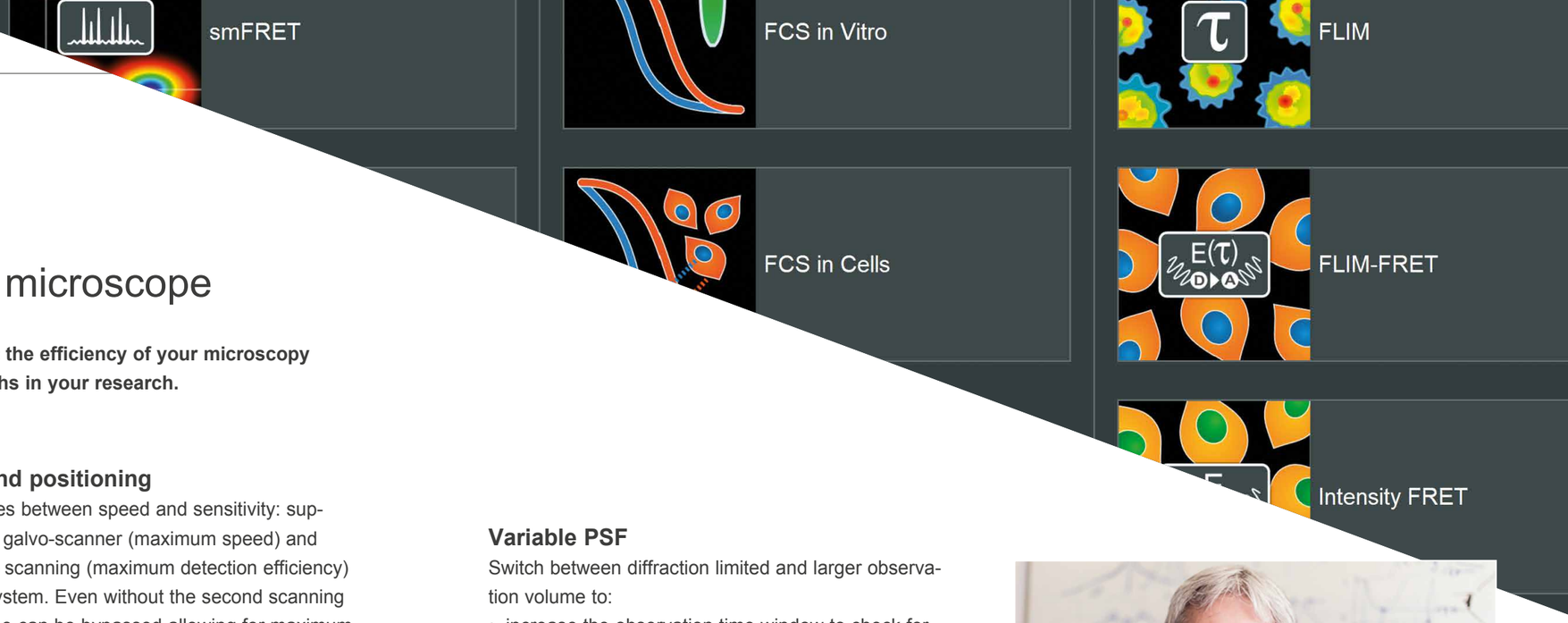
Environmental sensing and marker multiplexing

Additional application areas include:

- Mapping dynamics and structure of cellular membranes
- Characterization of functional nanovesicles
- Studying chemical reactions at the single molecule level
- Characterization of advanced materials

Core methodologies

- **Single molecule FRET (burst and time trace analysis)**
- **Fluorescence Lifetime Imaging (FLIM)**
- **Fluorescence Correlation Spectroscopy**
- **FLIM-FRET**
- **rapidFLIM^{HiRes} for fast processes**
- **Anisotropy Imaging**
- **DIC Imaging**



Luminosa

The single photon counting confocal microscope

Pairing highest data quality with remarkable simplicity: Luminosa boosts the efficiency of your microscopy related workflows and is a reliable companion while you explore new paths in your research.

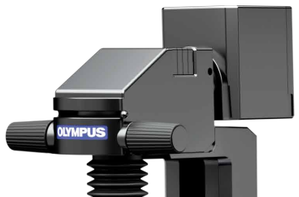
- *One-click autoalignment, requiring no sample*
- *GPU accelerated fitting, requiring minimal user interaction*
- *Standardized context-based workflows for smFRET, FLIM, FCS, etc.*
- *Automated recognition of immobilized emitters and subsequent recording of individual intensity time traces*
- *No compromise: Bypass galvo scanner for high-photon sensitivity applications*
- *Optimize observation volume to match the dynamics of your FCS or smFRET assay*
- *smFRET corrections according to community-driven benchmark study*

Excitation and detection options

Freedom of laser line choice to best fit to your sample. Integrate up to 8 PicoQuant lasers with emissions ranging from 375 to 980 nm that support Pulsed Interleaved Excitation (PIE) mode. Free space detection path is optimized for sensitivity with up to 6 point detectors. Get high sensitivity with SPADs for photon-demanding applications and/or hybrid PMTs for fast dynamic imaging with outstanding timing performance. Cutting-edge MultiHarp TCSPC electronics guarantee optimal performance for all time-resolved applications (< 1 ns dead time, 5 ps bin width, and 32 ps jitter).

Scanning and positioning

No compromises between speed and sensitivity: supports FLIMBee galvo-scanner (maximum speed) and piezo-objective scanning (maximum detection efficiency) on the same system. Even without the second scanning option, FLIMBee can be bypassed allowing for maximum sensitivity for point FCS and single molecule FRET measurements.
A positioning stage allows for quick overview imaging.

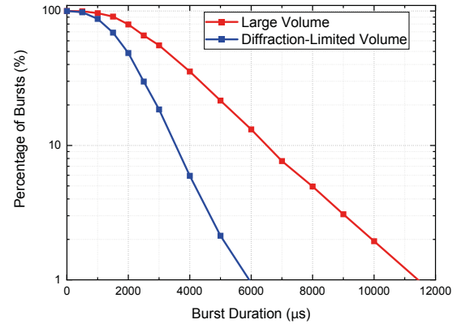


Variable PSF

Switch between diffraction limited and larger observation volume to:

- increase the observation time window to check for dynamic transitions between states
- study diffusion properties of larger particles

Example: smFRET experiment of a freely diffusing DNA-oligomer
Percentage of bursts with a duration larger than x µs



"The variable PSF offers a very convenient way of fine-tuning single molecule FRET and FCS measurements."

Prof. Benjamin Schuler, University of Zurich

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Published by: PicoQuant GmbH
May 2022
Editorial and production: Juliberg Designs
Tina Stundner, Berlin
Photos: PicoQuant GmbH