

Xper-FLIM

The only system of choice for
fluorescence lifetime imaging of
both value and performance
by **NANOBASE**



Time-Correlated Single Photon Counting

Fluorescence lifetime imaging microscopy or FLIM is an imaging instrument type for producing an image based on the differences in the exponential decay rate of the fluorescence from a fluorescent sample.

Fluorescence lifetime imaging yields images with the intensity of each pixel determined by τ , which allows researchers to view contrast between materials with different fluorescence decay rates, and also produces images which show changes in other decay pathways.

Fluorescence lifetimes can be determined in the time domain by using a pulsed source. When a population of fluorophores is excited by an ultrashort or delta pulse of light, the time-resolved fluorescence will decay exponentially.

Time-correlated single-photon counting (TCSPC) is usually employed as a measurement method because it compensates for variations in source intensity and single photon pulse amplitudes. More specifically, TCSPC records times at which individual photons are usually detected by a single photon avalanche photo diode (SPAD) with respect to the excitation laser pulse.

The recordings are repeated for multiple laser pulses and after enough recorded events, researchers are able to build a histogram of the number of events across all of these recorded time points. This histogram can then be fit to an exponential function that contains the exponential lifetime decay function of interest, and the lifetime parameter can accordingly be extracted.

Xper-FLIM is equipped with the single-photon avalanche diode (SPAD)-TCSPC FLIM system and can offer options of detection channels at low-cost, realizing super fast analysis for FLIM researchers. Xper-FLIM is also available in either an inverted microscope or an upright microscope to meet a recently growing number of various application needs.



Biology/Medical Research

- Molecular biological analysis
- Biochemical analysis



Semiconductors

- Monitoring and analysis of wafer quality



Photoelectron Materials

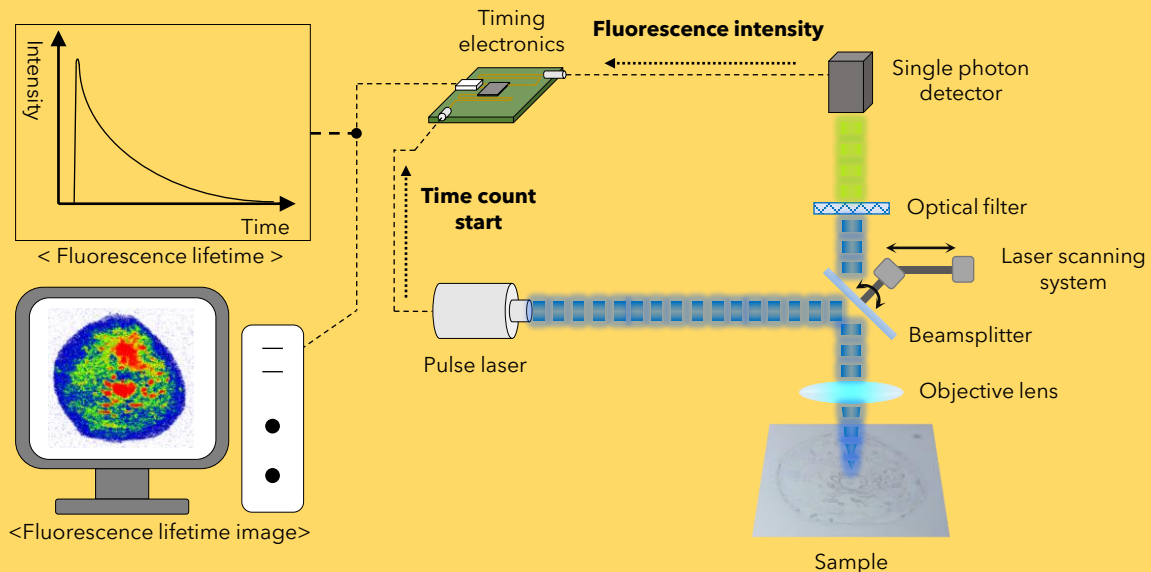
- Efficiency analysis of LED, OLED



Solar Cells

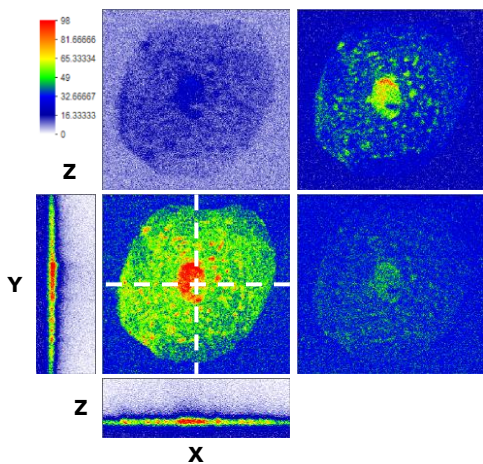
- Efficiency analysis of injection

SCHEMATIC DIAGRAM OF XPER-FLIM OPERATION

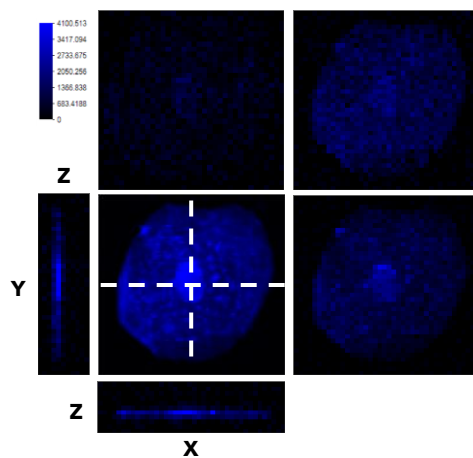


ANALYSIS DATA FROM XPER-FLIM & XPERRF

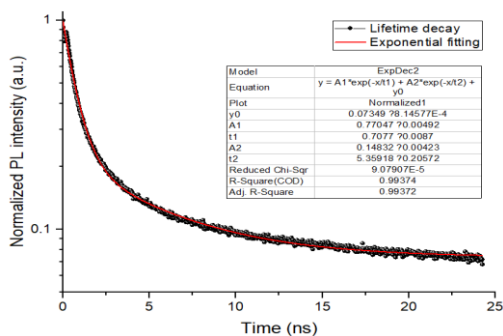
3-dimensional fluorescence intensity*



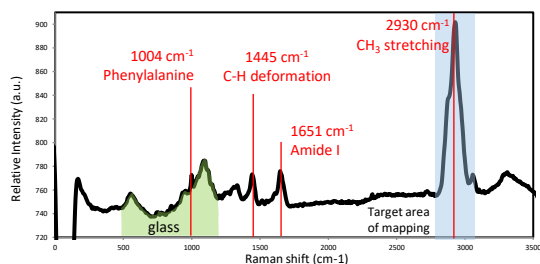
Raman intensity mapping image*



Lifetime decay of nucleus area*



Averaged Raman spectrum*



* Sample : Single oral epithelial cell

Microscope	<ul style="list-style-type: none"> - Reflected LED illuminator for bright field - Mechanical X-Y stage with right-hand control - Automatically controlled Z-axis position - Includes main frame, stage plate, control box, interface cable, power cable - 40X objective (other options : 10X, 20X, 50X, and 100X) - Upright or inverted microscope
Laser Scanning Module	<ul style="list-style-type: none"> - Wavelength range: 400~1000 nm - Laser scanning mode: Raster scan - Scanning area: 200 μm \times 200 μm (when using a 40X objective lens) - Includes a 15 MP camera for optical image acquisition (FOV: 220 μm \times 150 μm when using 40X) - A controller is included (USB1.1) - Maximum scan speed: >100 lines/s
Laser	<p><u>Picosecond pulsed diode laser and driver</u></p> <ul style="list-style-type: none"> - Wavelength: 390 ~ 700 nm - Freespace / Fiber coupling selection (optional)
Optical Filter	<p><u>Choose filters corresponding to laser wavelength</u></p> <ul style="list-style-type: none"> - Wavelength range: 390 ~ 700 nm - Interchangeable in a filter box for corresponding lasers
System Platform	<ul style="list-style-type: none"> - 1 slot to connect a laser neutral density (ND) filter or a polarizer - 2 slots to connect polarizers or waveplates - 1 slot to connect an interchangeable filter set - Up to 3 lasers are installable. - Fiber coupling port is installable. - Provides a robust platform for stable beam alignment
Detector	<p><u>Photon detection efficiency</u></p> <ul style="list-style-type: none"> - 24 % at 400 nm - 49 % at 550 nm - 37 % at 650 nm - Active area diameter : 50 μm - Dark counts: <250, <100, <50, <25 cps (depending on grade of detector) - NIM timing output: 50 ps - After-pulsing probability: <3%
Laser Driver	<ul style="list-style-type: none"> - Repetition rate: 31.25 kHz ~ 80 MHz - Trigger: Level -1 to +1 V (adjustable) - Frequency range: 10 Hz ~ 80 MHz - Synchronization output: Amplitude <0.8 mV into 50 Ohms
Electronics	<p><u>Time-tagging electronics</u></p> <ul style="list-style-type: none"> - Detection channels: 1 or 2 - Time range: 25 ps - Trigger: 0~ -1200 mV - Count rate: 40 MHz - Marker: TTL x4
NanoSpectrum Software Suite	<ul style="list-style-type: none"> - Fluorescence lifetime acquisition & imaging - Spectrum data export format: .txt, .csv - 2D mapping data export format: .spm, .csv

Specifications are subject to change without notice.

Xper-FLIM	<ul style="list-style-type: none"> - Cat. No. : XPER-FLIM - Functionalities : FLIm (TCSPC) analysis only
XperRF	<ul style="list-style-type: none"> - Cat. No. : XPERRF - Functionalities : FLIm (TCSPC) + Raman analysis