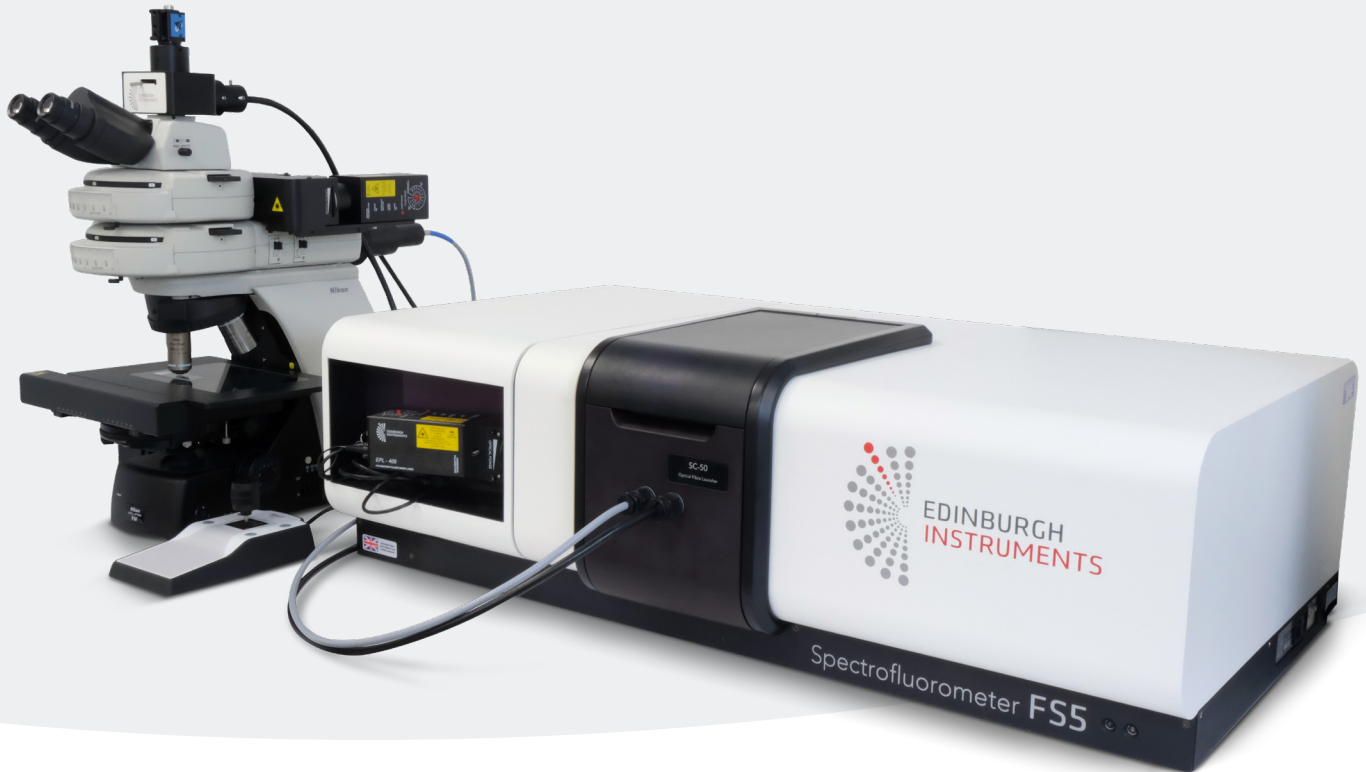


# MicroPL

Upgrade For Edinburgh Instruments  
Photoluminescence Spectrometers



The MicroPL Upgrade for Edinburgh Instruments Photoluminescence Spectrometers such as the FLS1000 or FS5 allows the study of spectral or time-resolved photoluminescence of samples in the microscopic scale.

An Edinburgh Instruments photoluminescence (PL) spectrometer can be converted into a combined spectrometer and microscope system with this user-friendly upgrade.

A wide range of microscope configurations, source coupling and detector options are available enabling both steady state and fluorescence lifetime microscopy, as well as automated maps, using the same setup.

Just like Edinburgh Instruments spectrometers, the PL microscope is fully configurable to meet your specific needs and can be upgraded with additional capability in the future.

It is also possible to couple your own microscope to the FLS1000 or FS5 for a custom MicroPL upgrade (please get in touch for models supported).

## Key Features



### Spectral and Time Resolved

Suitable for any type of photoluminescence experiment



### Customisable

Tailored to your application and upgradable in the future



### FLIM Add-On

Accessible and user-friendly fluorescence lifetime mapping



### Plug & Play

Easy to swap between MicroPL and FLS1000 or FS5 standard sample holders



### All-In-One Software

Including data acquisition, analysis and presentation



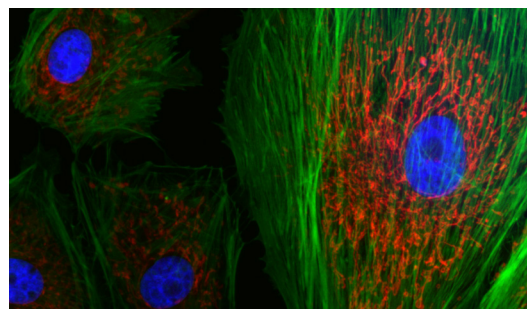
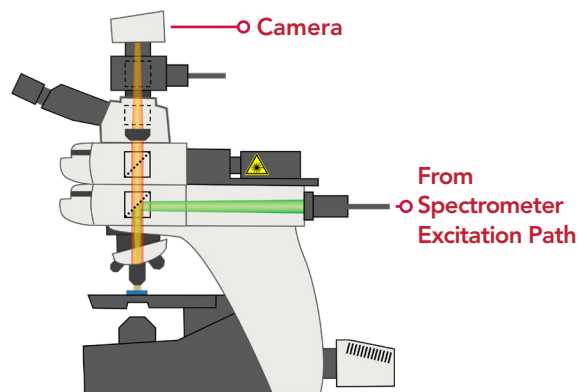
## EXCITATION SOURCE FLEXIBILITY TO SUIT YOUR APPLICATION

MicroPL is coupled to the spectrometer via liquid light guides or fibres. It is possible to excite the full field of view of the microscope's objective (widefield excitation), or a specific point in the sample with a laser (point excitation).

### WIDEFIELD EXCITATION

In widefield excitation, the spectrometer's lamp and monochromator are used to select the wavelength of the light exciting the sample. Wavelength and bandwidth of the excitation light can be set in the software. This provides much more flexibility than traditional microscopy and removes the need for excitation filters – however, an additional white light excitation lamp can be fitted directly to the microscope if desired.

Widefield microscopy imaging setup (above) and image of BPAE cells labelled with BODIPY, Texas Red and DAPI dyes (below), using FS5 Spectrofluorometer and MicroPL.

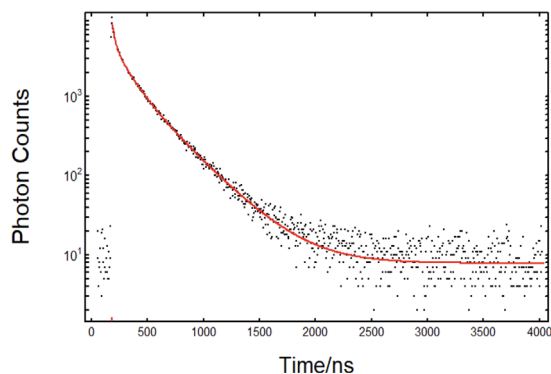
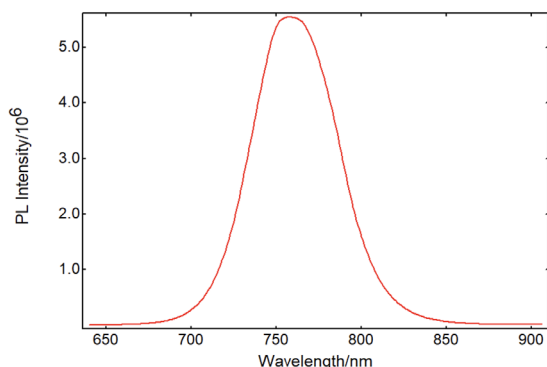
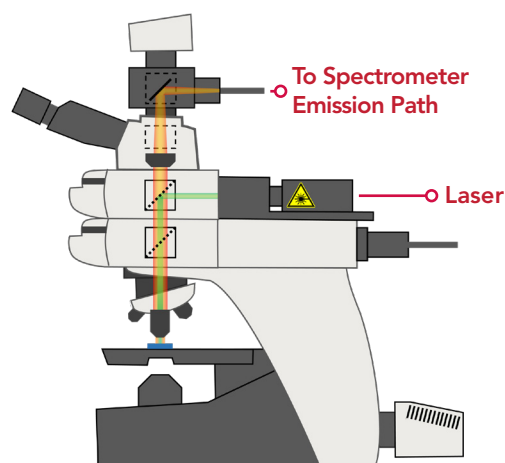


### POINT EXCITATION

Point excitation can be performed with either CW or pulsed lasers for spectral or lifetime PL measurements. MicroPL is compatible with Edinburgh Instruments EPL, HPL, and VPL diode lasers. A spot size of  $\sim 2 \mu\text{m}$  (source and objective dependent) is achievable, enabling to resolve PL spectra and lifetimes in the micrometer scale.

Both Time-Correlated Single Photon Counting (TCSPC) and Multi-Channel Scaling (MCS) operating modes are compatible, covering a wide range of photoluminescence lifetimes, from a few ps up to seconds. Non-standard applications such as upconversion PL microscopy are possible with the appropriate choice of filters and laser coupling.

Point excitation micro-spectroscopy setup (above right), PL spectrum (below) and TCSPC lifetime (below right) of a perovskite sample studied in an FLS1000 Spectrometer with MicroPL upgrade.





# FLIM ADD-ON

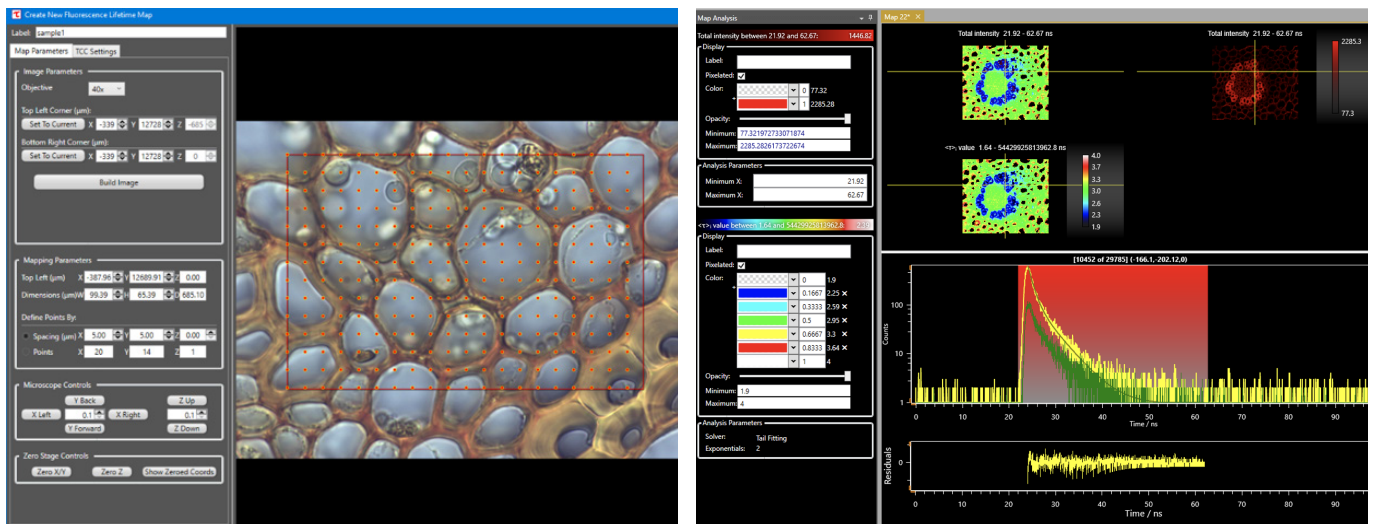
## FLIM MICROSCOPY MADE SIMPLE

MicroPL can be configured with a computer-controlled XYZ stage for Fluorescence Lifetime Imaging Microscopy (FLIM). This upgrade is designed with user-friendliness in mind: you do not need to be a microscopy expert to acquire good quality FLIM data.

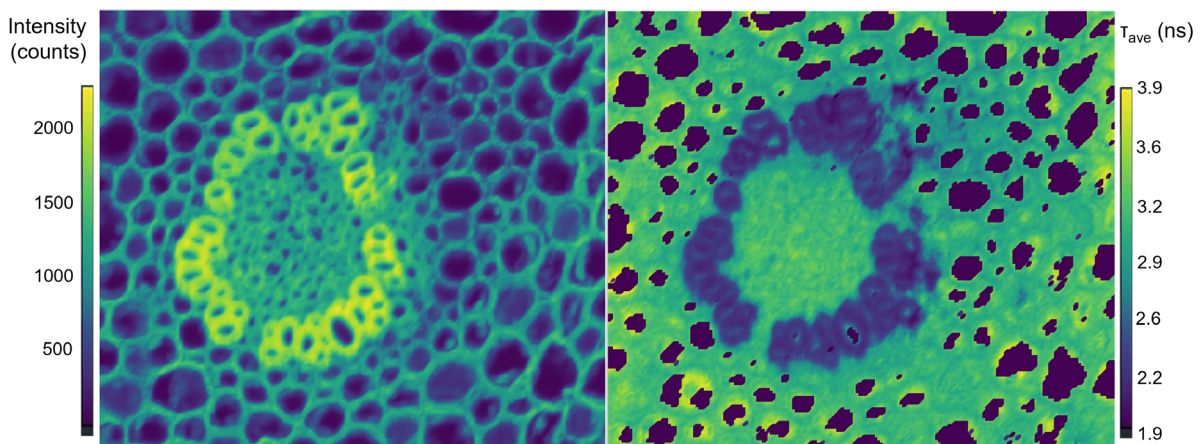
The FLIM add-on unlocks special features in the Fluoracle software including control of the stage and advanced analysis options for maps, such as multi-component decay fitting algorithms. No additional software packages are required to obtain and analyse data.

To acquire a FLIM map, the user defines the area or volume to scan across, as well as the spacing between data points and the lifetime acquisition parameters. The software then moves the stage acquiring a fluorescence decay in each data point.

The result is a map which can be represented according to intensity, average lifetime or single-component lifetime in each data point, amongst other options. Surface topography and 3D maps can be analysed and displayed in Fluoracle.



The user can define the mapping area and distance between points, view live data to adjust measurement parameters and access a range of map analysis and display options.



FLIM map of stained convallaria acquired in FS5 with MicroPL FLIM add-on. Results displayed as colour maps of fluorescence intensity (left) and intensity-weighted average lifetime (right).



# A MICROSCOPE TAILORED TO YOUR EXACT NEEDS

**Sample visualisation camera** included. Upgrade to sensitive camera for microscopy images.

**Binoculars** for easier focusing.

**Dichroic filter cubes** customisable to your application.

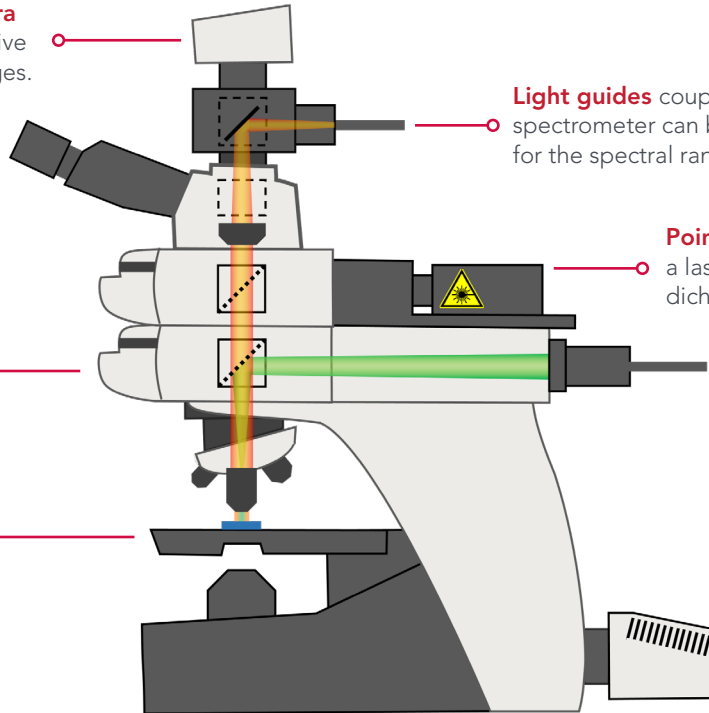
**Sample stage** can be manual or software controlled.

**Light guides** coupling to the spectrometer can be configured for the spectral range of interest.

**Point excitation** option adds a laser mount and additional dichroic turret.

**Widefield excitation** allows steady-state spectroscopy with tunable wavelength.

**White light source** for sample visualisation.



## Specifications

### MICROSCOPE MODELS

Upright: Nikon NiU, Olympus BX53  
Inverted: Nikon Ti2-U

### EXCITATION / EMISSION RANGE

360 nm – 850 nm (std)  
Can be extended with non-standard UV and NIR objectives

### EXCITATION MODES

Widefield: tunable continuous source from spectrometer (steady state)  
Point: EPL/HPL/VPL pulsed lasers (TCSPC or MCS lifetime) and CW lasers (steady state)

### DETECTION MODES

Micro-PL spectroscopy with spectrometer  
Fluorescence Microscopy with additional camera

### OBJECTIVE MAGNIFICATION

Options available from 5X to 100X

### SAMPLE STAGE

Manual or PC-controlled XYZ stage with specifications:  
75 mm x 50 mm or 130 mm x 85 mm options  
XY resolution 0.01  $\mu\text{m}$   
Z resolution 0.002  $\mu\text{m}$

### SOFTWARE

Mapping features in Fluoracle included with PC-controlled XYZ stage

### ACCESSORIES

Software-controlled cryostat upgrade



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