FLIM500

All-in-One Multifunctional Measurement

- ·PL Intensity Imaging
- ·PL/Raman spectroscopy
- ·TRPL Imaging
- ·Electroluminescence Imaging
- ·Carrier Diffusion Imaging
- ·Photocurrent Imaging



Specifications

Laser Scanning Galvo Mirror Systems

Laser input	Laser fiber optic input with an electrically controlled diaphragm system
Imaging range	4096 × 4096 pixels (Max)
Imaging magnification	1-32
Pinhole	25 μm-2 mm

Upright Microscope Module

Objectives	100×, 50×, 10× air lenses (oil immersion lenses are selectable)
Spatial resolution	≤ 260 nm

Steady-state Spectroscopy Module

Monochromator	Focal length: 300 mm
Detector	PMT or CCD
Spectral range	PMT: 185-900nm; CCD: 200-1100nm

TCSPC Module

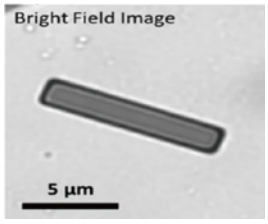
Frequency range	≤ 80 MHz
Time window (FIFO)	12.5 ns - 1 ms (Dependent on laser repetition rate)
Time window (MCS)	1 μs-15 s
Long lifetime measurement range	>1 h
Minimum time channel width (FIFO)	10 ps
Dead time	10 ns
Time channel	Unlimited, user definable
Spectral range	400-1100 nm
System IRF	< 350 ps

Selectable Module

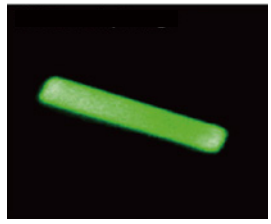
Picosecond laser at 375/405/440/480/510/635/665/690/850/940/1060 nm
Picosecond super-continuum white light laser (410-2400 nm)

PL Intensity Imaging, TRPL imaging

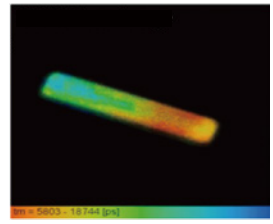
Confocal Scanning Imaging Mode	
Sample	$MAPbI_3$ nanowires
Objective	100×
Excitation wavelength	400 nm



Bright-field mapping



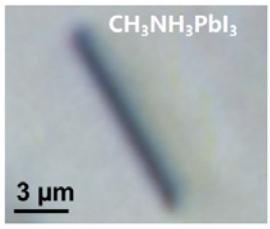
PL intensity mapping

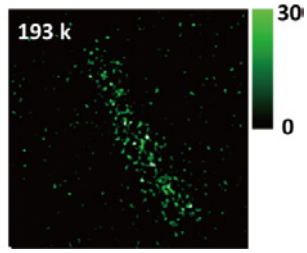


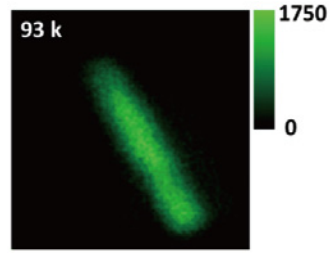
TRPL mapping

PL Imaging in a Low-Temperature Chamber

Confocal Scanning Imaging Mode	
Sample	$CH_3NH_3PbI_3$
Objective	100×
Excitation wavelength	400 nm





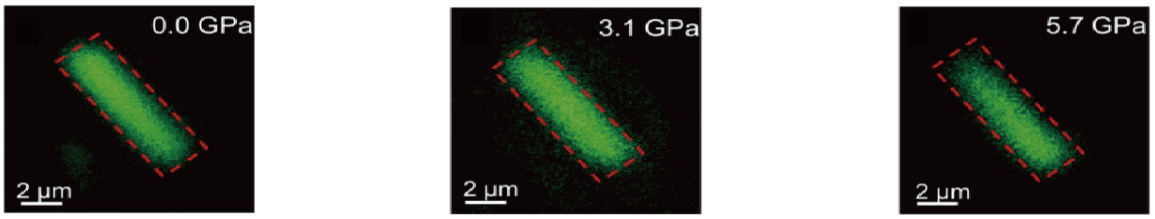


Observation of spatial distribution and evolution of the low-temperature phase transition process in $CH_3NH_3PbI_3$ nanowires

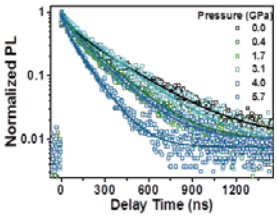
PL Imaging in a High-Pressure Chamber

Confocal scanning imaging mode, Carrier diffusion imaging mode

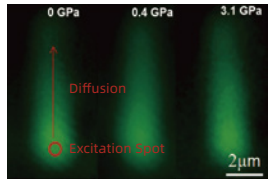
Sample	$MAPbI_3$ nanowires
Objective	100×
Excitation wavelength	400 nm



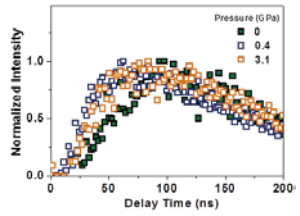
PL intensity mapping at different pressures



PL dynamics curves under different pressures



Carrier diffusion PL mapping under different pressures



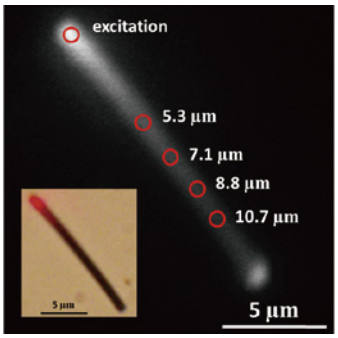
Carrier diffusion dynamics curves under different pressures

Reference: Yanfeng Yin, Wenming Tian, * etal., Jiming Bian, *and Shengye Jin*ACS Energy Lett.2022,7,154-161

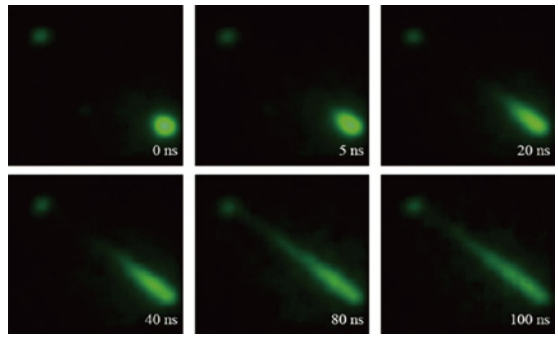
Carrier Diffusion Imaging

Confocal scanning imaging mode, Carrier diffusion imaging mode

Sample	$MAPbI_3$ nanowires
Objective	100×
Excitation wavelength	400 nm



Excitation-fixed PL scanning mapping (Time-integration)

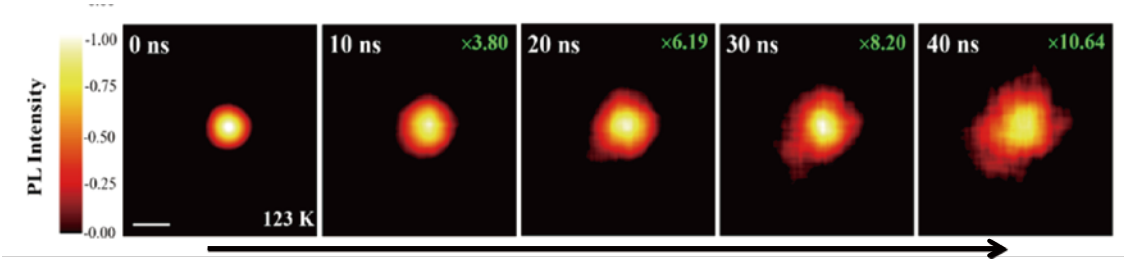


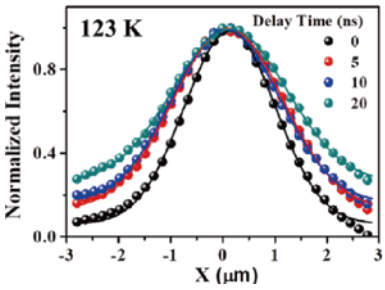
PL mapping at different times after excitation

Carrier Diffusion Imaging

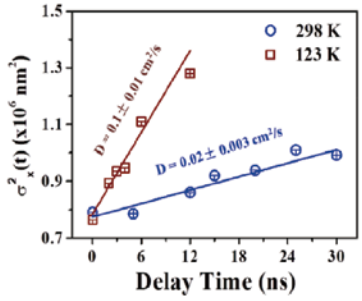
Spatiotemporal imaging of carrier diffusion in a $Cs_2AgBiBr_6$ perovskite

Sample	Lead-free double perovskite $Cs_2AgBiBr_6$
Objective	100×
Excitation wavelength	400 nm





Gaussian fitting for extracting PL spot-size information, σ^2



Fitted carrier diffusion coefficient

·Suitable for materials with short carrier diffusion lengths

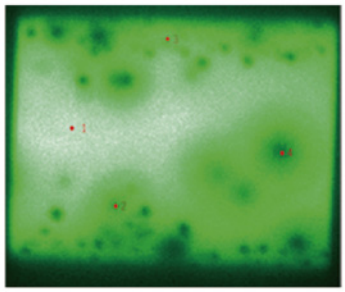
·Spatial resolution for carrier diffusion imaging: ~50 nm

EL Imaging

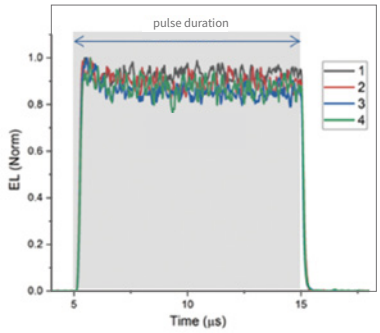
Sample Data

Sample	QD-LED	Voltage	10 V	Time precision	25 ns
Objective	4× air lens	Pulse width	10 μs	Acquisition time	28 min
Excitation wavelength	405 nm	Frequency	10 kHz	-	-

The EL distribution of the LED light-emitting layer can be observed, revealing the presence of areas with dead pixels.



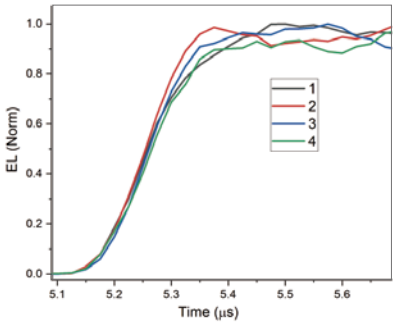
EL mapping diagram, with red dots indicating dead pixels.



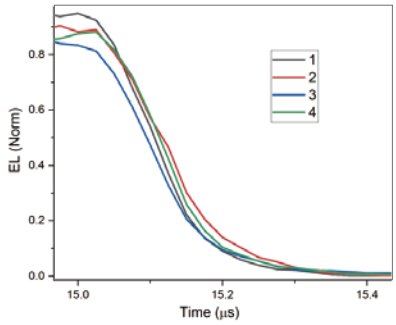
EL dynamics can be extracted for specific positions (1, 2, 3, 4).

·By extracting EL dynamics, differences and changes in EL dynamics across various micro-nano regions, as well as phenomena such as overshoot, can be observed.

·Continuous EL mapping can be employed to observe the aging process of LEDs.



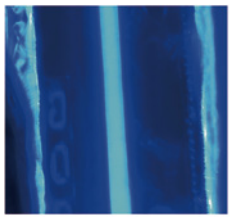
EL rising edge



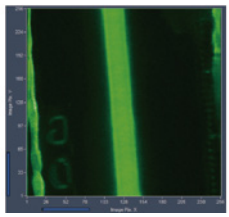
EL falling edge

Sample Data

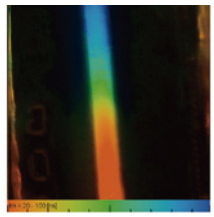
Sample	Laser chip
Excitation wavelength	515 nm



Bright-field mapping



EL intensity mapping

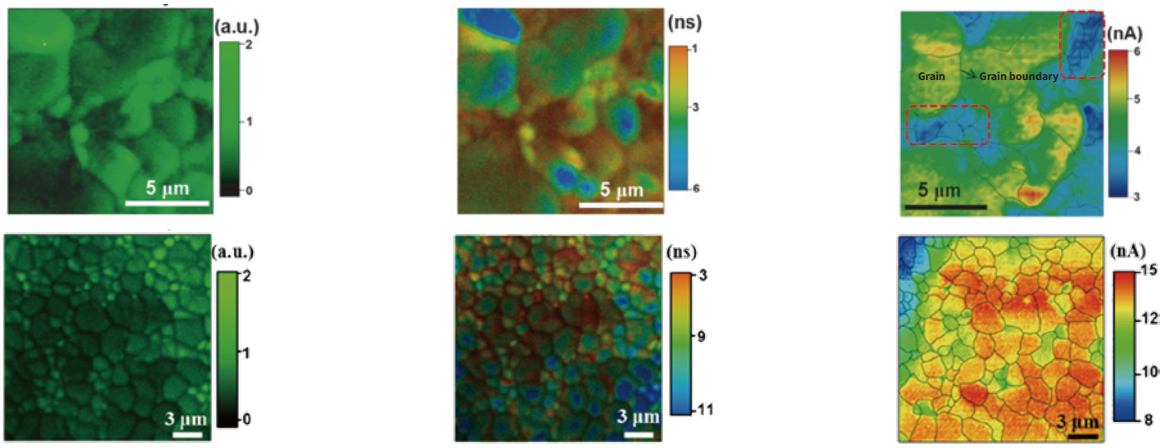


EL lifetime mapping

Photocurrent Imaging

Sample imaging of a 2D solar cell structure (ITO/SnO_2/QW/Spiro-Au)

Sample	Perovskite solar cells device
Objective	100×
Excitation wavelength	405 nm



PL intensity mapping

PL lifetime mapping

Photocurrent mapping

·Clear differentiation of spatial structures such as battery grains, grain boundaries, and the distribution of photocurrent among different grains.

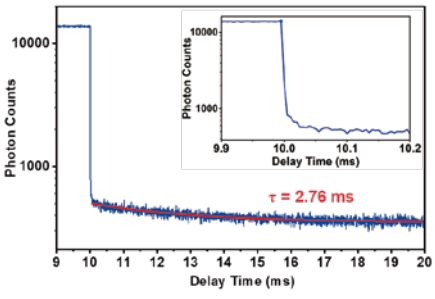
·Compatible with collecting fluorescence intensity and fluorescence lifetime imaging for analyzing the photocurrent generation mechanism.

Long-Lifetime Mode Measurement

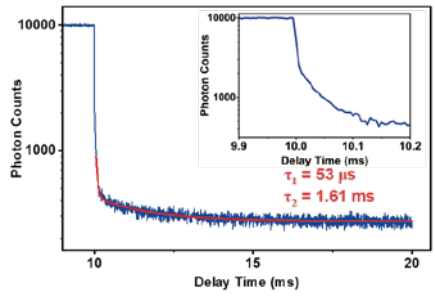
Wide time-range fluorescence and phosphorescence lifetime characterization

Sample	Tc-FR
Objective	405 nm
Excitation wavelength	10 MHz

Sample	Tc-FR
Objective	405 nm
Excitation wavelength	10 MHz



Long-lifetime PL decay profiles of Tc-FR under 405 nm excitation



Long-lifetime PL decay profiles of Tc-2BrFR under 405 nm excitation

·Supports wide time-range PL and phosphorescence lifetime characterization

·Suitable for the analysis of long-lifetime photophysical processes