TIME-TECH SPECTRA

T T S

Laser Scanning Confocal Fluorescence Imaging System

FLIM500

Global Leader in Time-Resolved Spectroscopy

Time-Tech Spectra USA, Inc.

FLIM500

All-in-One Multifunctional Measurement

- ·Fluorescence intensity imaging
- ·Fluorescence spectroscopy
- ·Fluorescence lifetime imaging
- ·Electroluminescence imaging
- ·Carrier mobility 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)
Wavelength range	400-900 nm

Inverted Microscope Module

Objectives	100x, 50x, 10x air lenses (100x oil lens optional)
Spatial resolution	≤ 260 nm (100x oil lens)

Steady-state Spectroscopy Module

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

TCSPC Module

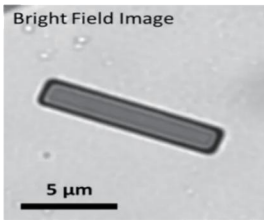
Time accuracy	7 ps
Spectral range	200-870 nm (PMT)
	400-1100 nm (APD)
Number of Bin channels	4096
Time window	5 μs (expandable for long-lifetime testing)
Time resolution	≤ 70 ps

Available Light Source

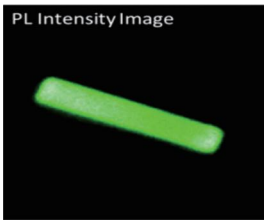
Picosecond laser at 375/405/440/480/510/635/665/690/850/940/1060 nm
Picosecond super-continuum white light laser (410-2400 nm)

Fluorescence Intensity Imaging, Fluorescence Lifetime Imaging

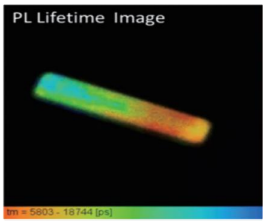
Confocal Scanning Imaging Mode	
Sample	$MAPbI_3$ nanowires
Objective	100 X
Excitation wavelength	400 nm



Bright-field imaging



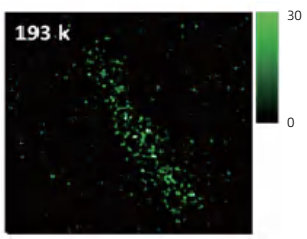
FL intensity imaging

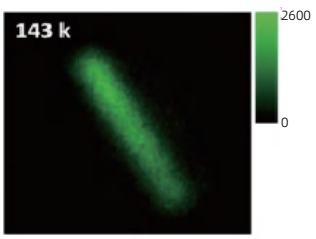


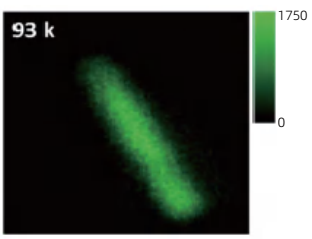
TRPL imaging

Fluorescence Imaging in a Low-Temperature Chamber

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





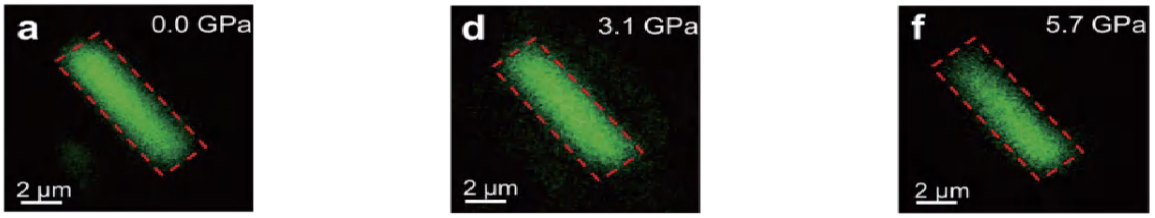


Observation of spatial distribution and evolution of the low-temperature phase transition process in perovskite nanowires

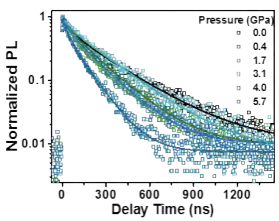
Fluorescence Imaging in a High-Pressure Chamber

Confocal scanning imaging mode, Carrier migration imaging mode

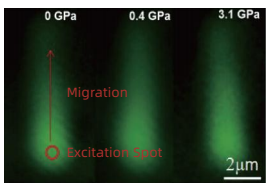
Sample	$MAPbI_3$ nanowires
Objective	100 X
Excitation wavelength	400 nm



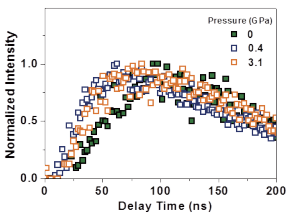
PL intensity imaging at different pressures



Fluorescence dynamics curves under different pressures



Carrier migration fluorescence imaging under different pressures



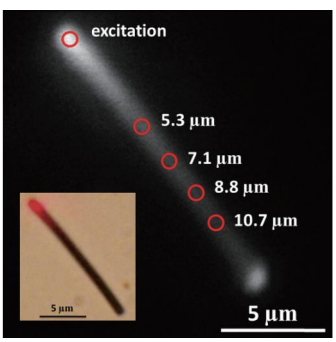
Carrier migration dynamics curves under different pressures

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

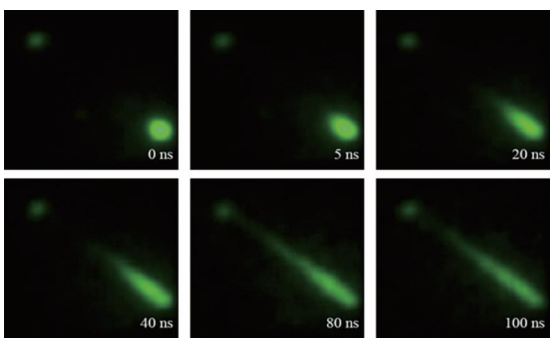
Carrier Migration Imaging

Confocal scanning imaging mode, Carrier migration imaging mode

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



Excitation-fixed fluorescence acquisition scanning imaging (Time-integration)



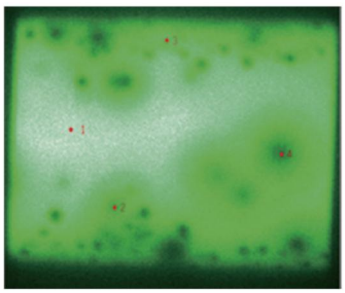
Time-division image

Electroluminescence (EL) Imaging

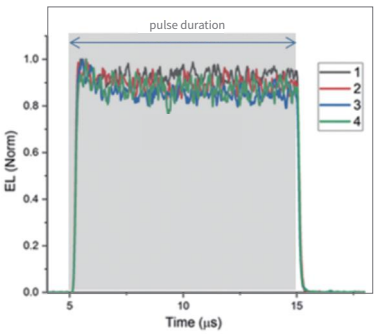
Sample Data

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

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



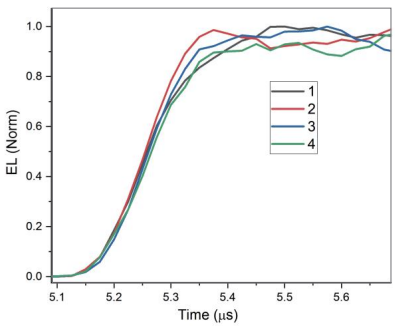
EL imaging diagram, with red dots indicating dead pixels.



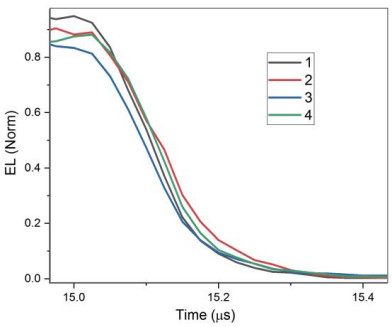
EL dynamics can be extracted for specific positions (1, 2, 3, 4).

·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 imaging can be employed to observe the aging process of LEDs.



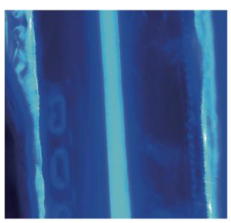
EL rising edge



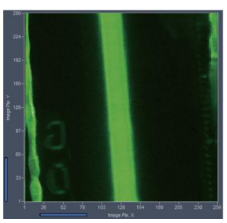
EL falling edge

Sample Data

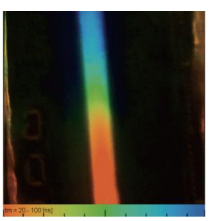
Sample	Laser chip
Excitation wavelength	515 nm



Bright-field imaging



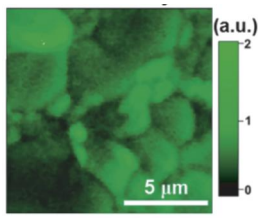
EL intensity mapping

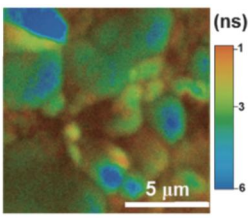


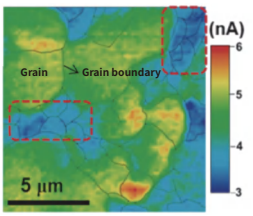
EL lifetime imaging

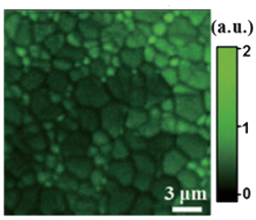
Photocurrent Imaging

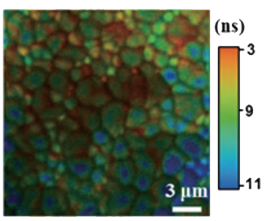
Sample imaging of a 2D solar cell structure (ITO/SnO_2/QW/Spiro-Au)	
Sample	Perovskite solar cells device
Objective	100 X
Excitation wavelength	405 nm

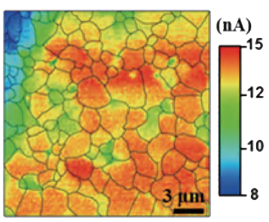












PL intensity mapping

Fluorescence lifetime imaging

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.

TIME-TECH SPECTRA

T T S

– – Global Leader in Time-Resolved Spectroscopy – –

Time-Resolved Spectroscopy

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Email:
sales@timetechna.com

Website:
www.timetechna.com