TIME-TECH SPECTRA
T T S

Global Leader in Time-Resolved Spectroscopy

TIME-TECH SPECTRA
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Time-Resolved Spectroscopy

High-Speed Spectrometer

Pulse Laser Technology

Semiconductors Optical inspection

Product Catalog

Transient Absorption | Fluorescence Spectroscopy | Non-Linear Optics

High-Speed Camera | Nanosecond Laser | Semiconductor Optical

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Time-Tech Spectra USA, Inc.


Global leader in Time-Resolved Spectroscopy
Innovator in High-Energy and High-Frequency Lasers

TIME-TECH SPECTRA
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About Us

Time-Tech Spectra (TTS) is a cutting-edge spectroscopy company found by a group of scientists in 2016, committed to developing advanced time-resolved spectroscopic techniques, devices and tools for both fundamental research and industrial semiconductor inspections. With our 6 product lines and more than 20 unique products, TTS provides state-of-the-art metrology solutions and instruments for material research in universities and institutes and for semiconductor wafer manufacturers, both production and R&D segments.

With continuous effort and innovation by our 3 global R&D centers throughout the years, TTS is now a leading company in time-resolved spectroscopy, with more than 200+ instrument sales worldwide .

Since 2022, TTS announced the offering of inspection instruments and metrology solutions based on our time-resolved techniques, particularly for defect detection in large-bandgap semiconductor wafers manufactures. Through the expertise of our professional engineers and scientists, our measurement techniques are based on deep understanding of semiconductor and optoelectronic materials. Our state-of-the-art metrology solutions and instruments proivded to our customers leads to more efficient production and research, along with the highest-level user experience.

Products

01

Transient Absorption Series

02

Fluorescence Spectroscopy Series

03

Non-linear Optics Series

04

High-Speed Camera Series

05

Laser Series

06

Semiconductor Optical Testing Series

07

TTS Precision Matching Series

01

TransientAbsorption Series

01
Ultrafast Transient Absorption Spectroscopy System

02
Ultrafast Transient Absorption Microscopic Imaging System

03
Nanosecond Transient Absorption Spectroscopy

04
Flash Photolysis System

05
Ultrafast Pump-Probe Shadowgraph Imaging System

06
Ultrafast Time-Resolved Terahertz Spectrometer

Ultrafast Transient Absorption Spectroscopy System-TA100

Main Technical Indicators

System host

Laser type	Ti:Sapphire Lasers	Yb-based Lasers
Spectral range	280 - 380 nm	350 - 500 nm
	320 - 650 nm	480 - 950 nm
	420 - 800 nm	1100 - 1650 nm
	850 - 1500 nm	—
Mode	Transmission/reflection/back pump	
Time window	8 ns	
Sensitivity	⩽10^{-5} OD	
IRF	⩽1.5x Pulse width	
Automation system	Automated switching of spectral ranges. Automated pump beam alignment. Automated optical delay line alignment	
Sample holder	solution, film, and powder	
Customer requirements	Cryostat, diamond anvil cell, magnetic field, etc.	
Software	Data acquisition, analysis and fitting	

Microscopic kinetics imaging module

Mode	Micro spectroscopy acquisition/wide-field TA imaging/carrier migration imaging
Spatial resolution	⩽1 μm
Wavelength range	400-800 nm
Carrier migration accuracy	100 nm

Nanosecond TA module

Spectral range	380-950 nm；1100-1600 nm
Time window	⩽450 μs (Extendable to ms)
Time accuracy	1 ns

Other expandable contents

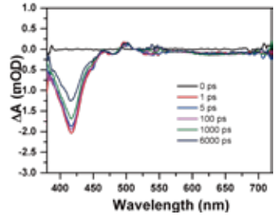
Spectral range to MIR	2-12 μm
TCSPC module	Time resolution ⩽100 ps
Ultrafast fluorescence module	Time resolution ⩽1.5X PW
Angel-resolved measurement module	Expandable for angel-resolved measurement module

Ultrafast Transient Absorption Testing Instance

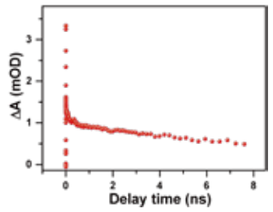
UV Data

Experimental condition

Sample	Tetracene dimer
Excitation wavelength	405 nm
Probe wavelength	UV-visible



Transient absorption spectra

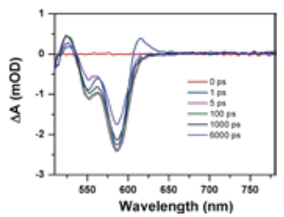


Transient absorption kinetics

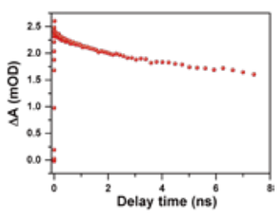
Visible Data

Experimental condition

Sample	CdSe QDs
Excitation wavelength	400 nm
Probe wavelength	Visible



Transient absorption spectra

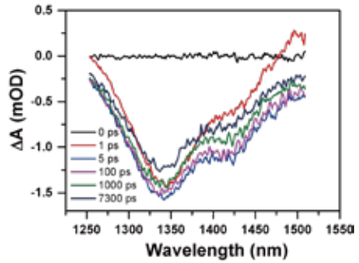


Transient absorption kinetics

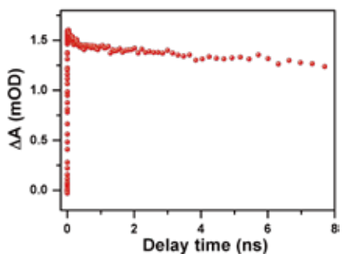
NIR Data

Experimental condition

Sample	Pbs QDs
Excitation wavelength	550 nm
Probe wavelength	NIR



Transient absorption spectra

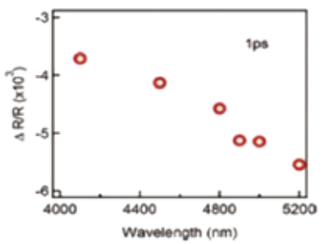


Transient absorption kinetics

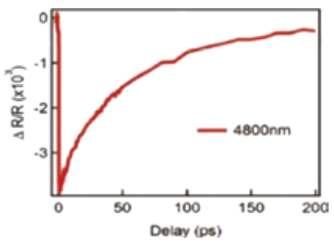
MIR Data

Experimental condition

Sample	Sb_2S_3 semiconductor material
Excitation wavelength	700 nm
Probe wavelength	MIR



Transient absorption spectra

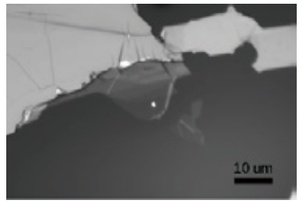


Transient absorption kinetics

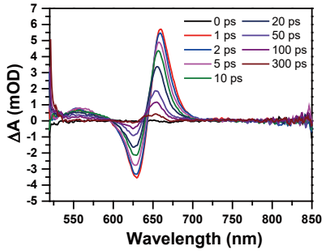
Micro Transmission TA

Experimental condition

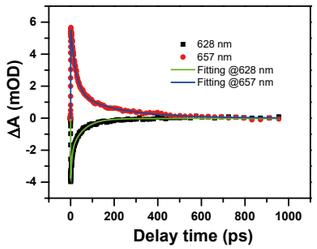
Sample	Single layer WS_2 (substrate: sapphire)
Excitation wavelength	515 nm
Probe wavelength	Visible



Bright-field imaging



Transient absorption spectra

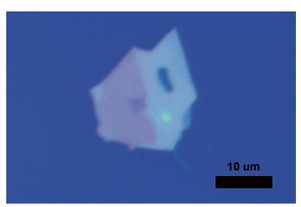


Transient absorption kinetics

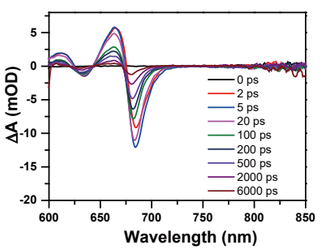
Micro Reflection TA

Experimental condition

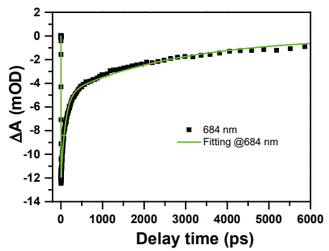
Sample	Monolayer WS_2 (substrate: Si)
Excitation wavelength	515 nm
Probe wavelength	Visible



Bright-field imaging



Transient absorption spectra spectrogram



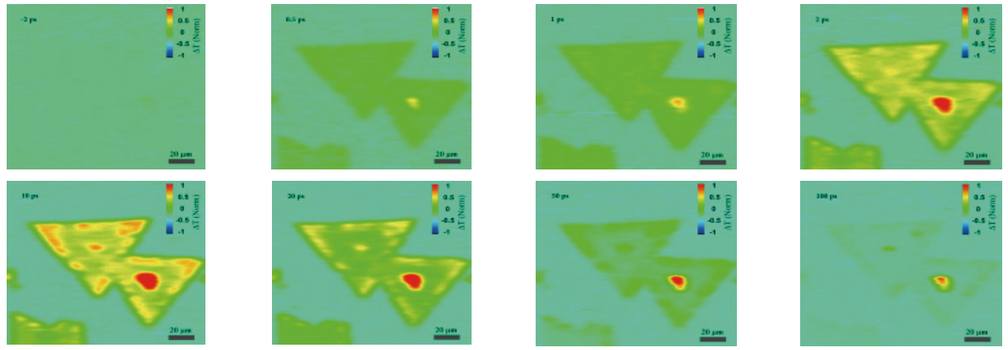
Transient absorption kinetics

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series |Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Wide-field TA Imaging

Experimental condition

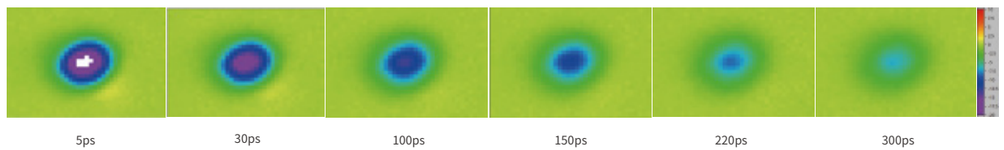
Sample	Monolayer WS_2
Excitation wavelength	515 nm
Probe wavelength	610 nm



Carrier Migration Data Diagram

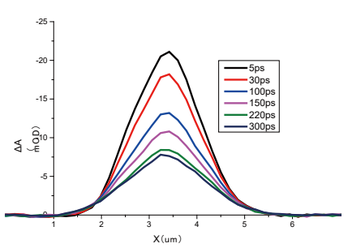
Experimental condition

Sample	WS_2
Excitation light wavelength	400 nm
Probe wavelength	580-620 nm

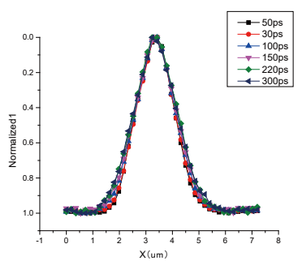


5ps 30ps 100ps 150ps 220ps 300ps

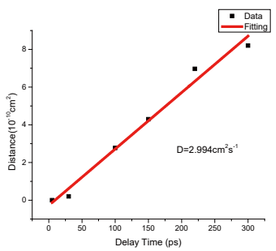
Carrier diffusion diagram



Original curve



Normalized curve



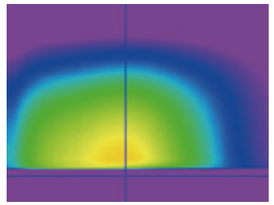
Calculating diffusion coefficient

Nanosecond Transient Absorption Testing

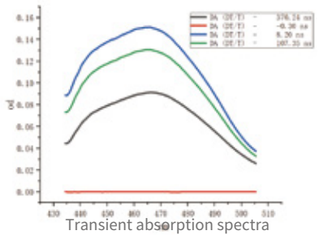
Visible Detection

Experimental condition

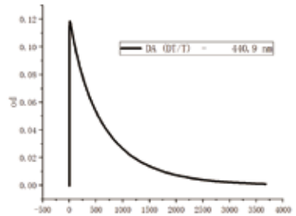
Sample	PtOEP
Excitation wavelength	440 nm
Probe wavelength	Visible area



Pseudo-Color Maps



Transient absorption spectra

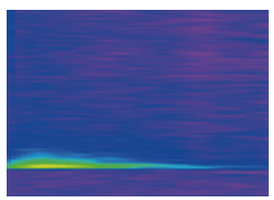


Transient absorption kinetics

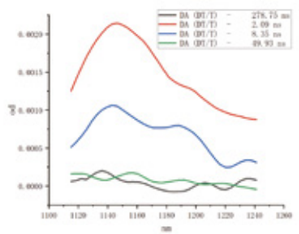
NIR Detection

Experimental condition

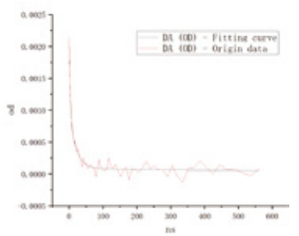
Sample	Broue
Excitation wavelength	343 nm
Probe wavelength	NIR area



Pseudo-color maps



Transient absorption spectra



Transient absorption kinetics

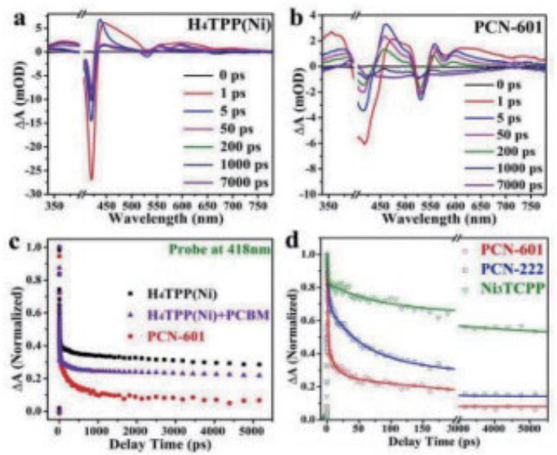
Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series |Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Article Instance

01

Photocatalysis

Author: Fujian Institute of Material Structure, Chinese Academy of Sciences
Journal: JACS
Using our company's TA100 ultrafast transient absorption spectroscopy, we have successfully achieved core kinetic analysis on metal-organic framework (MOF) materials during the process of photocatalytic CO_2 reduction.



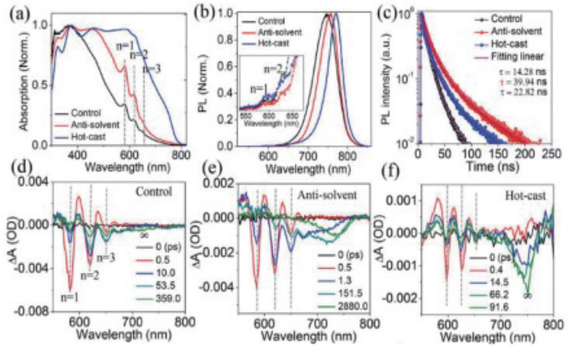
Name of the document

Boosting Interfacial Charge-Transfer Kinetics for Efficient Overall CO_2 Photoreduction via Rational Design of Coordination Spheres on Metal-Organic Frameworks.J.Am.Chem.Soc.2020,142,28,12515-12523

02

Perovskite Solar Cells

Author: Fujian Institute of Material Structure, Chinese Academy of Sciences
Journal: JACS
Using our company's TA100 ultrafast transient absorption spectroscopy, we have achieved core kinetic analysis of metal-organic framework (MOF) materials in the process of photocatalytic CO2 reduction.



Name of the document

Dynamical Transformation of Two-Dimensional Perovskites with Alternating Cations in the Interlayer Space for High Performance Photovoltaics.J.Am.Chem.Soc.2019,141,6,2684-2694

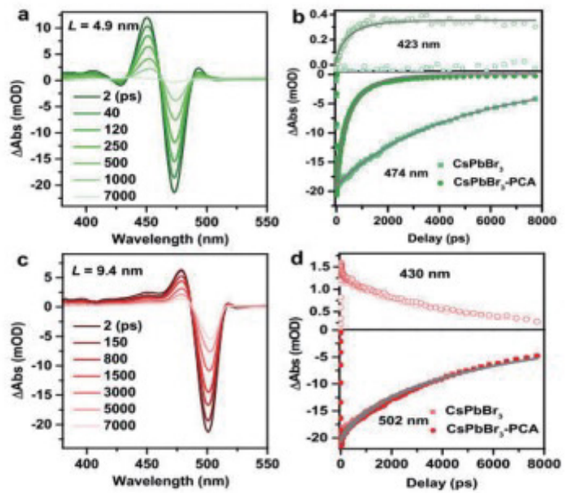
Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series |Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Article Instance

03

Perovskite Nanomaterials

Journal: JACS
Using our company's TA100 ultrafast transient system, we have achieved the detection of triplet energy transfer processes in perovskite quantum dots and molecular composite systems.



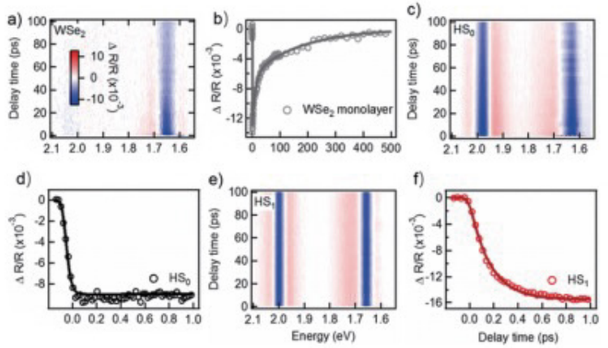
Name of the document

Triplet Energy Transfer from CsPbBr3 Nanocrystals Enabled by Quantum Confinement.Journal of the American Chemical Society,2019,141 (10):4186-4190 A

04

2D Materials

Journal: ACS Nano
Using our company's TA100 ultrafast transient reflection microscopy system, we have achieved the study of carrier dynamics in single-layer/multilayer WSe_2 two-dimensional material heterostructures.



Name of the document

Controlling Exciton and Valley Dynamics in Two-Dimensional Heterostructures with Atomically Precise Interlayer Proximity.ACS Nano 2020, 14,4,4618-4625

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series |Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Flash Photolysis System-LFP100

Main Technical Indicators

Detecting light source system

Light source	Xenon lamp
Spectral range	185-2000 nm

Data acquisition system

Mode	Transmission mode
Spectral range	250-900 nm
Sensitivity	⩽1 mOD
Time window	⩽0.1 s (Depends on the l aser repetition rate)
IRF	⩽10 ns

DPSS nanosecond OPO laser

Laser output wavelengths	1064/532/355/266 nm
OPO output wavelength	210-350 nm/420-700 nm/720-2300 nm

Software

Data acquisition, analysis and fitting, etc.

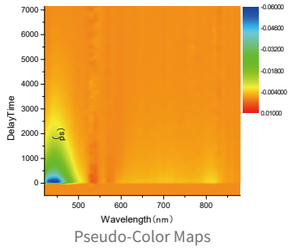
Other expandable contents

Wavelength range of NIR	900-1600 nm
Wavelength range of MIR	1-12 μm
Rapid spectral acquisition	IsCMOS detector, optical shutter 3 ns

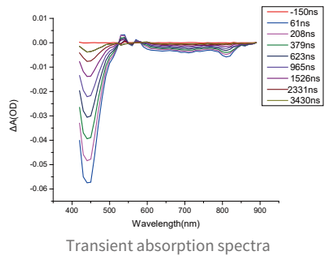
Applications

Experimental condition

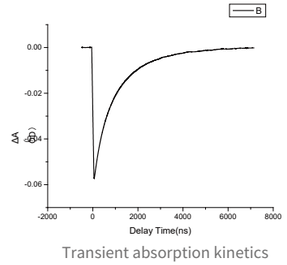
Sample	TPP	Excitation wavelength	532 nm



Pseudo-Color Maps

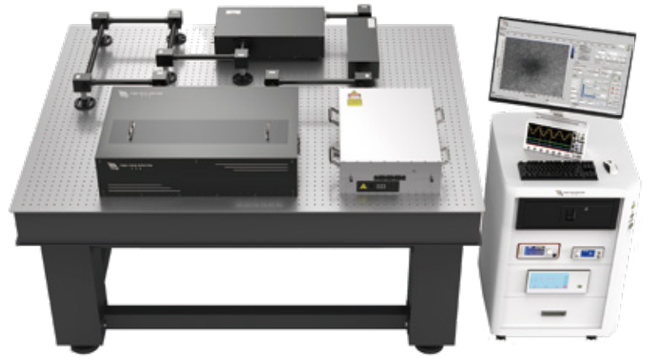


Transient absorption spectra



Transient absorption kinetics

Ultrafast Pump-Probe Shadowgraph Imaging System-UPSI100

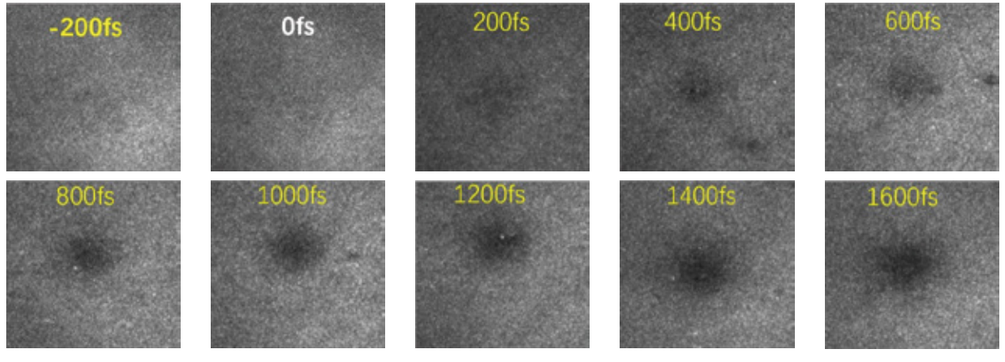


Main Technical Indicators

Mode	Ultrafast optical damage/Plasma sputtering
Time window	8 ns
Detector type	IsCMOS(gate time: 3 ns)
Detection IRF	＜1.5X Pulse Width
Objectives	20X/50X selectable
Sample movement	Automatic 2D movement
Software functions	Data acquisition/analysis software

Applications

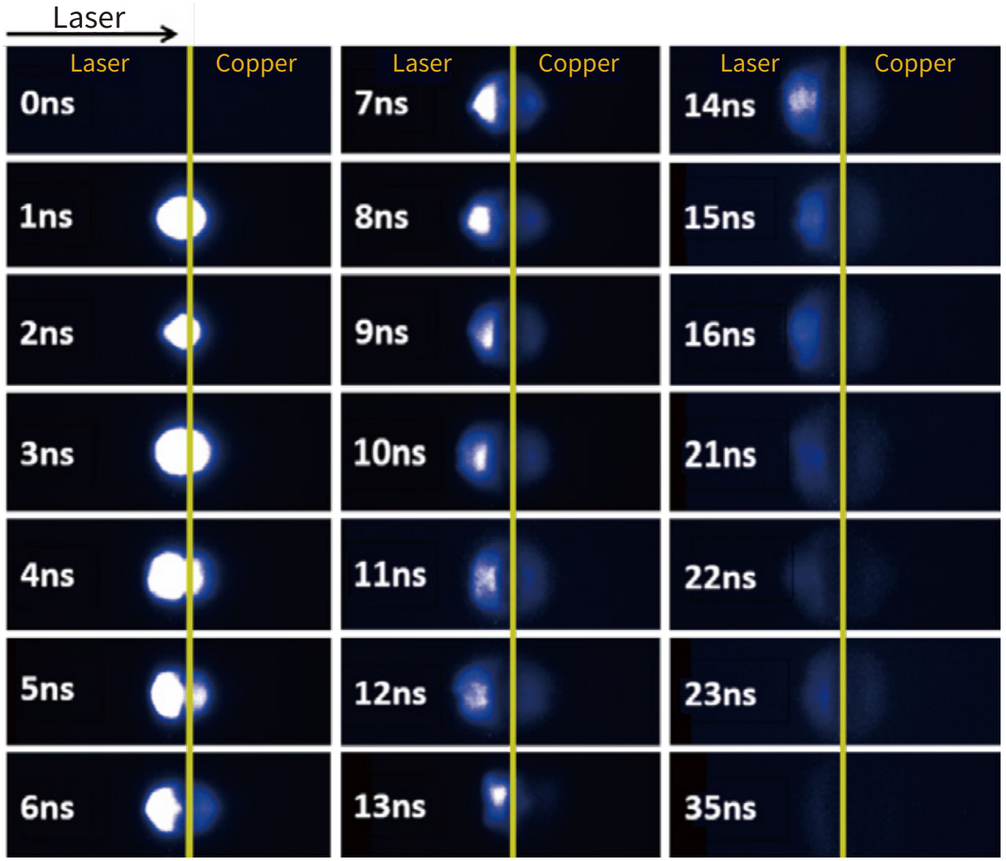
Ultrafast time-resolved light damage



Surface damage detection in different time

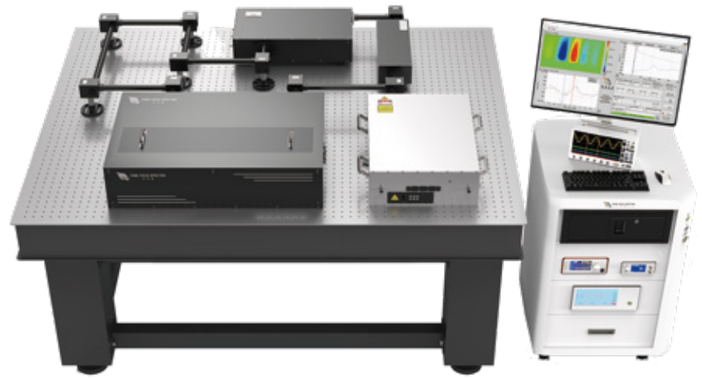
Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Plasma Sputtering Experiment



This function mainly uses the camera's gated acquisition feature and delay to capture the plasma sputtering process of the sample at various moments. The entire testing process involves focusing the laser on the sample, which produces plasma. At this stage, the camera's exposure time is set, functioning as a "gate." The timing is then adjusted to delay the "gate" relative to the time the laser reaches the sample, thereby capturing the plasma sputtering process at different time intervals.

Ultrafast Time-Resolved Terahertz Spectrometer System-THZ100



A nitrogen protection bin is designed in the optical path to reduce the terahertz energy loss.

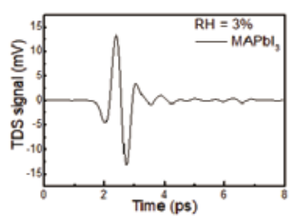
Main Technical Indicators

Spectral range	0.25-3 THz
Time window	8 ns
Mode	Transmission
Detector	Dual-aperture balanced detector
Sensitivity	$\leqslant 10^{-3}$
Automation system	Full-automatic optical path switching, automated optical path calibration
Nitrogen-filled sample chamber	Supporting solution, film, powder samples
Customer requirements	Supporting low temperatures and other conditions required by customers
Software functions	Data acquisition/analysis

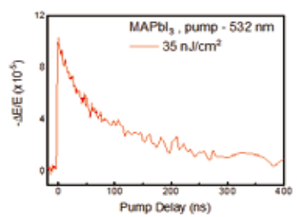
Applications

Experimental condition

Sample	$MAPbI_3$	Excitation wavelength	440 nm

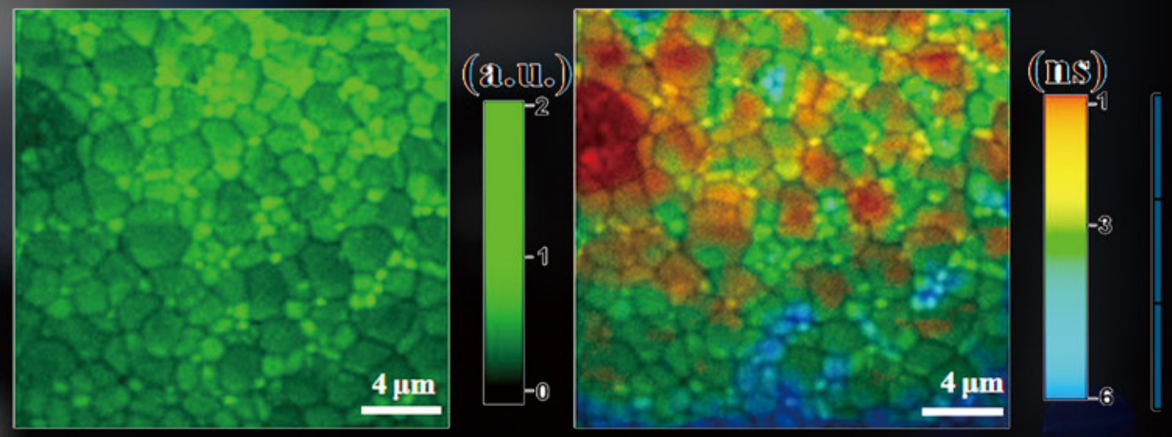


THz time-domain spectroscopy



Sample kinetics

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series



02

Fluorescence Spectroscopy Series

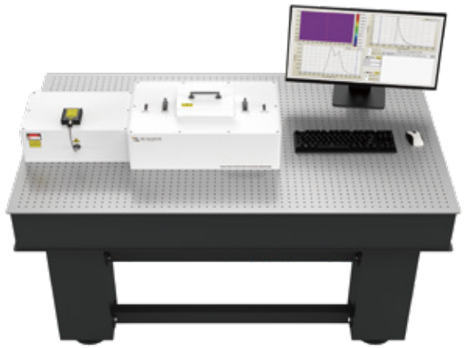
01
Steady-State/Transient Fluorescence Spectroscopy System

02
DUV Fluorescence System

03
Laser Scanning Confocal Fluorescence Lifetime Imaging Microscopy

04
Ultrafast Fluorescence Spectroscopy System

Steady-State/Transient Fluorescence Spectroscopy System -TPL300



Main Technical Indicators

Steady-state fluorescence module parameters

Monochromator	200/300/500 nm
Detector	PMT or CCD
Spectral range	250-900 nm. 900-1700 nm

Transient TPSPC module

Time window	⩽5 μs (expandable for phosphorescence testing)
Time Resolution	300 ps
Time chanel width	7 ps
Spectral range	350-900 nm

Selectable lasers

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

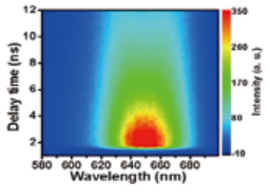
Expandable modules

Microscope module	spatial resolution⩽300 nm
PL Imaging module	PL intensity/lifetime/spectral imaging, carrier migration imaging, photocurrent imaging
EL Imaging module	EL intensity/lifetime/spectral imaging

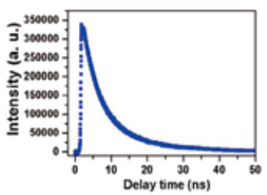
Applications

Experimental condition

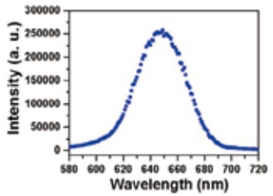
Sample	CdSe	Excitation wavelength	440 nm



Time-resolved spectroscopy



Fluorescence lifetime



Fluorescence spectroscopy

DUV Fluorescence System

Main Technical Indicators

Typical parameters

Fluorescence lifetime testing wavelength	220-600 nm
Fluorescence spectroscopy testing wavelength	200-1000 nm
Time resolution	⩽20 ps
Spatial resolution	⩽1 μs
Imaging capabilities	Fluorescence intensity or spectral imaging/Fluorescence lifetime imaging/DUV imaging
Imaging range	Customizable
Excitation wavelengths	206 nm/257 nm/343 nm/515 nm

Expansion capabilities

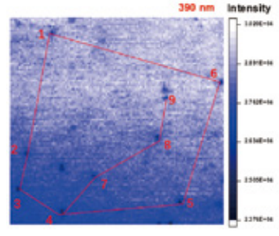
Expansion modules	Raman, second harmonic generation (SHG), photocurrent, and other imaging modules.
Customer requirements	Supporting expansion to external conditions such as cryostat, diamond anvil cell, magnetic fields, etc.

Applications

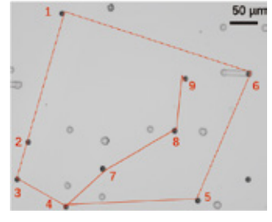
Optical Non-destructive Wafer Defects Detection

Experimental condition

Sample	SiC epitaxial wafer	Excitation wavelength	343 nm	PL collection wavelength	390 nm



DUV fluorescence imaging



KOH etching image

The figure illustrates a comparison between fluorescence imaging and KOH corrosion imaging, highlighting the accuracy and comprehensiveness of fluorescence imaging technology in defect detection.

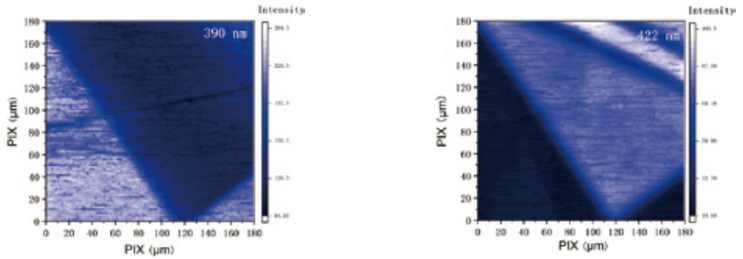
Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Applications

Optical Non-destructive Wafer Defects Detection Experimental condition

Experimental condition

Sample	SiC epitaxial wafer	Excitation wavelength	343 nm	PL collection wavelength	390 nm

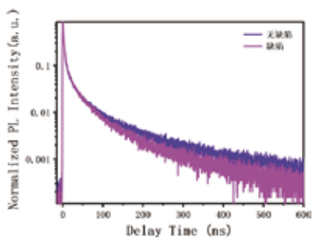


Confocal fluorescence imaging at 390 and 422nm

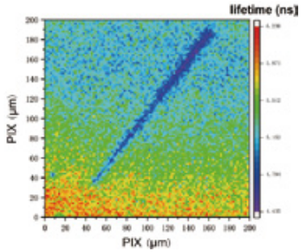
Wafer Time-Resolved Photoluminescence (TRPL) and FLIM

Experimental condition

Sample	SiC epitaxial wafer	Excitation wavelength	343 nm	PL collection wavelength	390 nm



TRPL spectroscopy

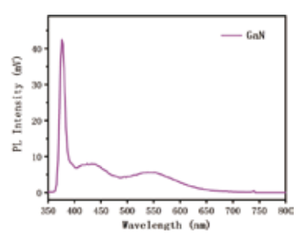


FLIM

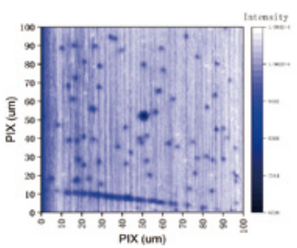
Wafer PL Spectroscopy and PL Intensity Imaging

Experimental condition

Sample	SiC epitaxial wafer	GaN	343 nm	PL collection wavelength	390 nm



(TRPL) spectroscopy



PL intensity imaging

Laser Scanning Confocal Fluorescence Lifetime Imaging Microscopy - FLIM300

Product Features

- Fluorescence intensity and lifetime imaging
- Carrier migration imaging
- Fluorescence/Raman spectroscopy acquisition
- Photocurrent imaging
- EL imaging

Main Technical Indicators

Laser Scanning Galvo Mirror Systems

Laser input	Laser fiber optic input with an electrically controlled diaphragm system
Imaging range	4096*4096 pix (Max)
Wavelength range	400-900 nm

Inverted microscope module

Objectives	100x, 50x, 10x 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	400-900 nm

TCSPC module

Time accuracy	7 ps
Spectral range	400-900 nm
Number of Bin channels	4096
Time window	5 μs (expandable for long-lifetime testing)
Time resolution	⩽70 ps

Selectable module

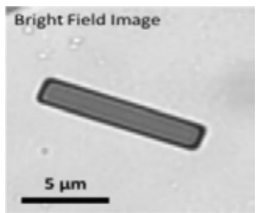
Picosecond laser at 375/405/440/480/510/635/665/690/850/940/1060 nm
Picosecond super-continuum white light laser (410-2400 nm)

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

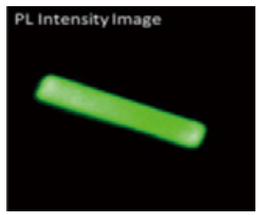
Fluorescence Intensity Imaging, Fluorescence Lifetime Imaging

Confocal scanning imaging mode

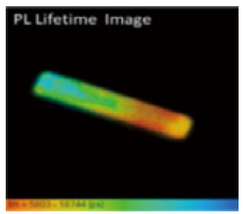
Sample	$MAPbI_3$ nanowires
Objective	100X
Excitation wavelength	400 nm



Bright-field imaging



FL intensity imaging

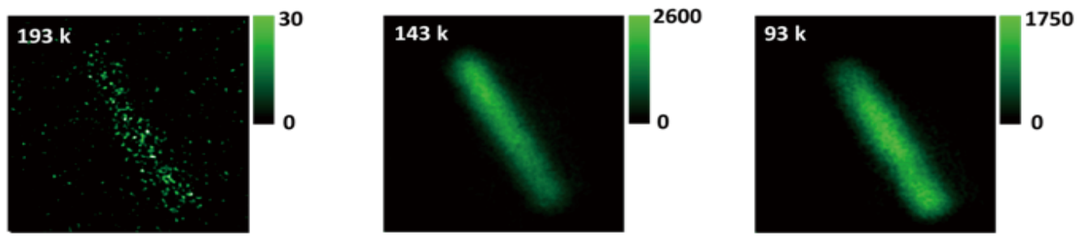


TRPL imaging

Fluorescence Imaging in a Low-Temperature Chamber

Confocal scanning imaging mode

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



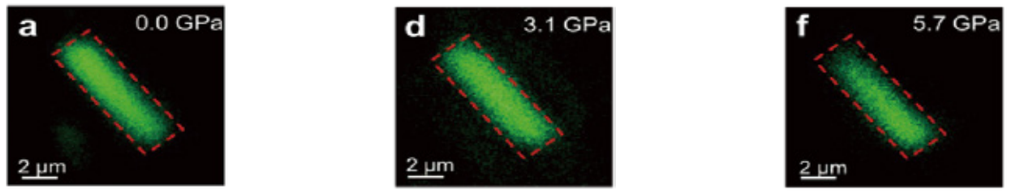
Observation of spatial distribution and evolution of the low-temperature phase transition process in perovskite nanowires

Reference:YanfengYin, WenmingTian, * etal., JimingBian, *and ShengyeJin*ACS Energy Lett.2022,7,154−161

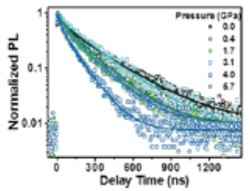
Fluorescence Imaging in a High-Pressure Chamber

Confocal scanning imaging mode, Carrier migration imaging mode

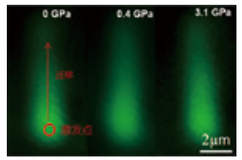
Sample	$MAPbI_3$ nanowires
Objective	100X
Excitation wavelength	400 nm



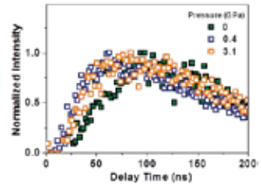
PL intensity imaging at different pressures



Fluorescence dynamics curves under different pressures



Carrier migration fluorescence imaging under different pressures

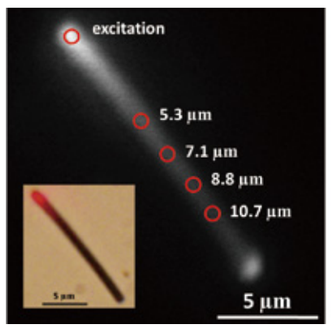


Carrier migration dynamics curves under different pressures

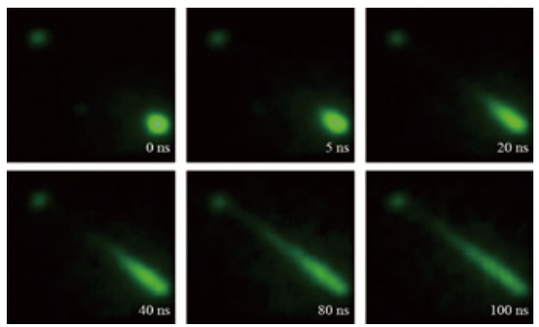
Carrier Migration Imaging

Confocal scanning imaging mode, Carrier migration imaging mode

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



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



Time-division image

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

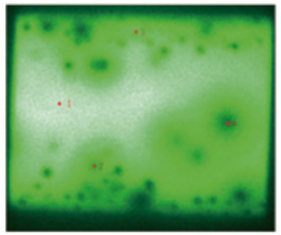
Electroluminescence (EL) Imaging

Applications

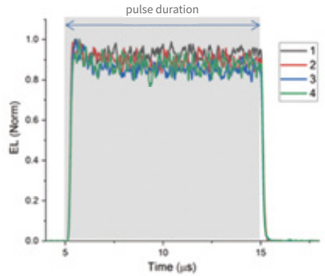
Testing condition

Sample	QDs 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.



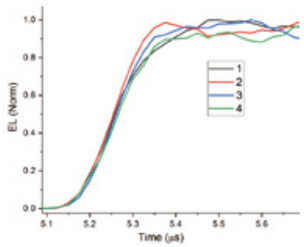
EL imaging diagram, with red dots indicating dead pixels.



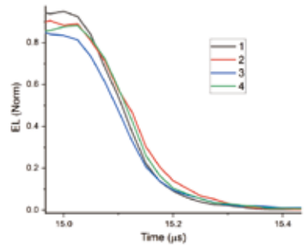
EL dynamics can be extracted for specific positions (1, 2, 3, 4).

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

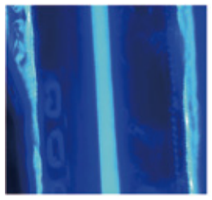


EL falling edge

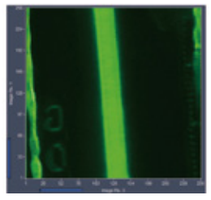
Applications

Experimental condition

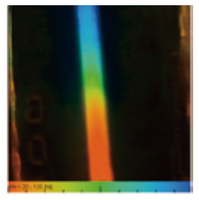
Sample	Laser chip	Excitation wavelength	515 nm



Bright-field imaging



EL intensity imaging



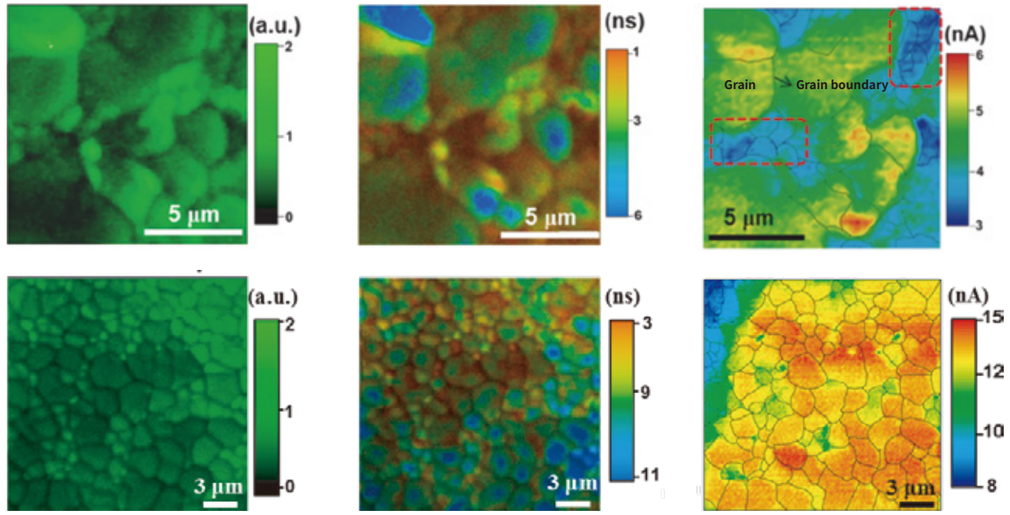
EL lifetime imaging

Photocurrent Imaging

Applications

Experimental condition

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



Fluorescence intensity imaging

Fluorescence lifetime imaging

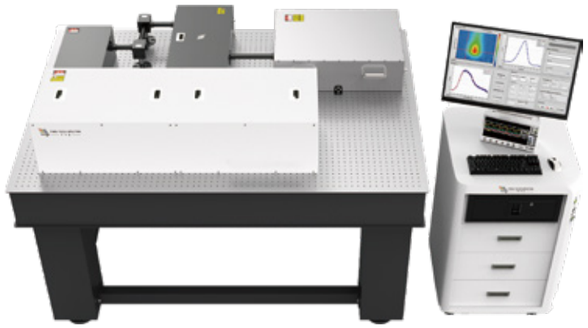
Photocurrent imaging

Photocurrent imaging of a 2D solar cell structure (ITO/SnO2/QW/Spiro-Au)

It can clearly differentiate spatial structures such as battery grains, grain boundaries, and the distribution of photocurrent among different grains."
It is compatible with collecting fluorescence intensity and fluorescence lifetime imaging for analyzing the photocurrent generation mechanism.

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Fluorescence Spectroscopy Series | Non-linear Optics Series | Transient Absorption Series

Ultrafast Fluorescence Spectrometers System - UF100



Main Technical Indicators

Testing method	Streak camera	Fluorescence up converting	Kerr gate
Time resolution	⩽3.5 ps	⩽450 fs	⩽1 ps
Time window	100 μs	8 ns	8 ns
Spectral range	250-850 nm	360-900 nm	400-800 nm
Detector	Streak camera	Highly sensitive photomultiplier tube (PMT)	Line-scan cooled charge-coupled device (CCD)
Spectral acquisition method	Broad spectral acquisition	Dynamics scanning	Broad spectral acquisition
Software	Data acquisition/analysis software		

Expandable module

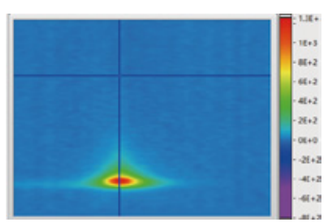
Micro module	Spatial resolution ⩽500 nm	—	—

Applications

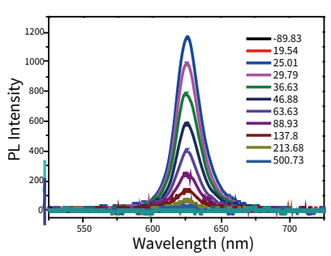
Streak Camera Testing

Experimental condition

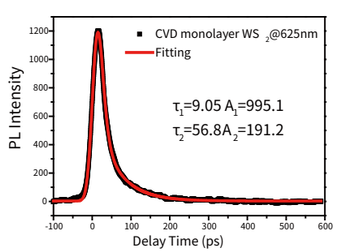
Sample	CVD single layer WS_2	Excitation wavelength	515 nm



Time-resolved spectroscopy



PL spectroscopy

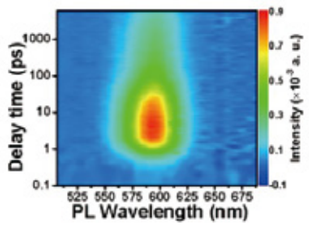


TRPL

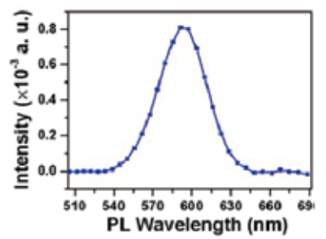
Ultrafast Fluorescence Up Converting Testing

Experimental condition

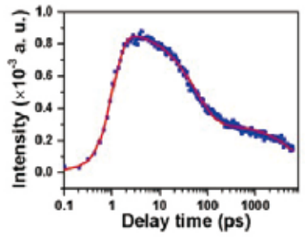
Sample	CdSe/ZnS QDsolution	Excitation wavelength	400 nm



Time-resolved spectroscopy



PL spectroscopy

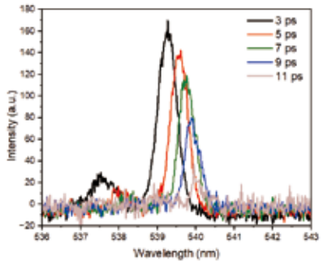


TRPL

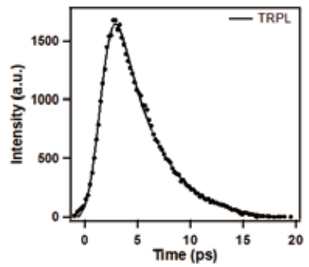
Kerr Gate Testing

Experimental condition

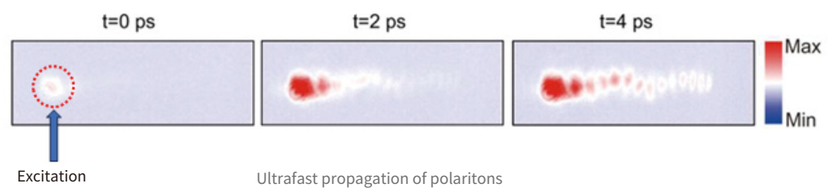
Sample	Perovskite	Excitation wavelength	400 nm



Luminescence spectroscopy



TRPL



Ultrafast propagation of polaritons

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

03

Non-linear Optics Series

01

Z-scan Testing System

02

SHG Testing System

Z-Scan Testing System-ZTS100

Main Technical Indicators

Precision optical displacement stage

Speed	30 mm/s
Minimum resolution	0.1 μm
Repositioning accuracy	＜2 μm

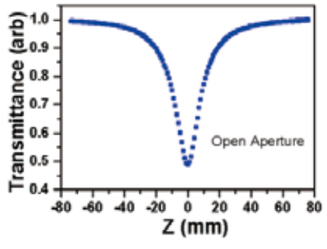
Power detector

Test wavelength	350-1700 nm
Power testing range	50 nW-40 mW
Debounce	Simultaneous acquisition of dual-channel reference signals

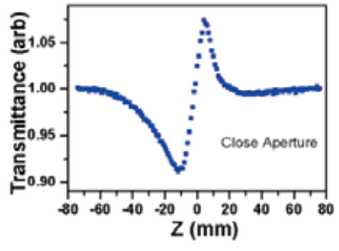
Applications

Experimental condition

Sample	Monocrystalline silicon
Excitation wavelength	1030 nm
Probe wavelength	1030 nm



Open aperture mode



Close aperture mode

SHG Testing System-SHG100

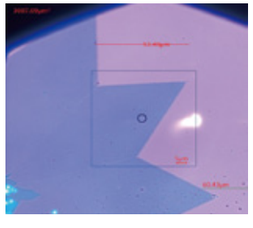
Main Technical Indicators

Microscope type	Upright microscope
Configuration of objectives	10X, 50X
Spatial resolution	⩽1 μm
Electric control displacement stage	The scanning range is 20×20 mm. Synchronous triggering scanning is supported and utilized for SHG imaging.
Polarization optical rotation stage	Pre-installed adapter wave plate
Detector	PMT
Software functions	Data acquisition/analysis

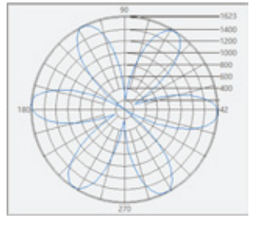
Applications

Experimental condition

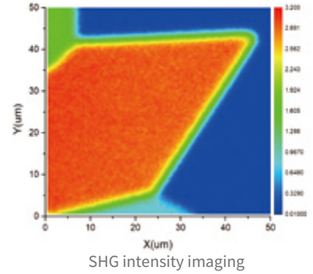
Sample	WS_2
Excitation wavelength	1030 nm
Probe wavelength	515 nm



Bright-field imaging



Polarization-dependent SHG diagram



SHG intensity imaging

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

04

High-Speed Camera Series

01

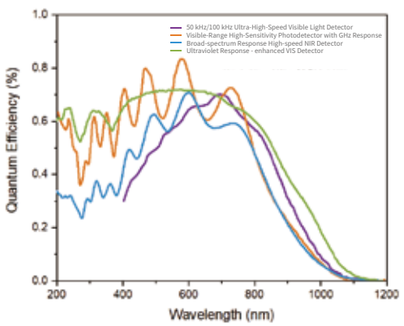
High-Speed Camera

High-Speed Camera

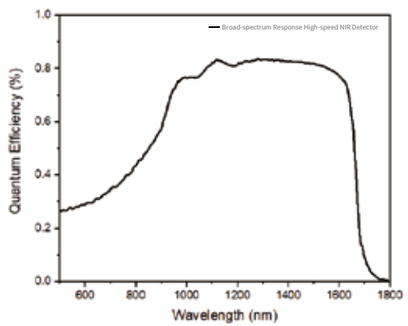
Product Type

- Broad Spectral Response High-Speed NIR Detector
- Broad Spectral Response High-Speed Visible Detector
- Highly Sensitive High-Speed Visible Detector
- UV Response-Enhanced Visible Detector
- 50 KHZ/100 KHZ Ultra High-Speed Visible Detector

Quantum Efficiency of the detector



Visible detector quantum efficiency



NIR detector quantum efficiency

High-Speed Camera Series

Main Technical Indicators

Model	50 kHz/100 kHz Ultra High-Speed Visible Detector	Broad Spectral Response High-Speed Visible Detector	Broad Spectral Response High-Speed NIR Detector	Highly Sensitive High-Speed Visible Detector	Highly Sensitive High-Speed Visible Detector
line array version	50 kHz: single/double line array 100 kHz: single line array	Single-/double-line array			Single-line array
Length of photosensitive area	16.3 mm	25.6 mm (1024 pixel) 12.8 mm (512 pixel)	12.8 mm	28.672 mm (2048 pixel) 7.168 mm (512 pixel)	28.672 mm
Detection wave band	400-1000 nm	200-1000 nm	500-1700 nm	200-1000 nm	200-1000 nm
Number of pixels in a single array	128	1024, 512	256	2048, 512	2048
Pixel size	127 μm×127 μm	25 μm×500 μm	25 μm×500 μm	14 μm×200 μm	14 μm×500 μm
Peak quantum efficiency	70% @ 700 nm	58% @ 750 nm	80% @ 1550 nm	78% @ 700 nm	76% @ 600 nm
Dynamic range	72 dB	69 dB (High Gain) 74 dB (Low Gain)	72 dB (High Gain) 76 dB (Low Gain)	76 dB	72 dB
Full-well capacity	10 Me-	5.8 Me (High Gain) 25.3 Me (Low Gain)	17.5 Me (High Gain) 175 Me (Low Gain)	0.1 Me-	0.2 Me-
Conversion efficiency	0.35 μV/e-	0.56 μV/e- (High Gain) 0.13 μV/e- (Low Gain)	0.16 μV/e- (High Gain) 0.016 μV/e- (Low Gain)	25 μV/e-	10 μV/e-
Maximum line rate	50 kHz：50000 lines/s 100 kHz：100000 lines/s	9000 lines/s (1024 pixel) 18000 lines/s (512 pixel)	160000 lines/s	4000 lines/s (2048 pixel) 16000 lines/s (512 pixel)	4000 lines/s
Minimum exposure time	2 μs	1 μs	2 μs	6 μs	2 μs
Data bit depth	16 bit				
Temperature control mode	Active air conditioning				
Trigger mode	Software (internal trigger) / Hardware (external trigger)				
Synchronous signal input	External trigger, pump–probe synchronization				
Data interface	Gigabit Ethernet				
Power supply	9 V/2 V				
Optical interface	Free space				
Camera size	130 mm×121 mm×68 mm				
Application software	LabVIEW				
Operating environment	Temperature 0~40 °C, humidity 10%~85% (no condensation)				

05

Laser Series

01

High Energy DPSS

Nd: YAG Nanosecond Pulse Laser

02

High Energy and High Frequency DPSS YAG-OPO Laser

High Energy DPSS Nd: YAG Nanosecond Pulse Laser

Product Features

- High energy
- High frequency
- Excellent beam quality
- Diodes have a long lifespan.
- Customization is available based on customer needs.

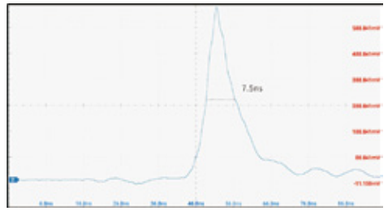
The FlatTop series is a diode-pumped Nd:YAG nanosecond pulse laser with high output energy, high frequency, excellent beam quality, advanced intelligence, compact structure, and easy maintenance. This series of lasers utilizes a Gaussian cavity to emit flat-top light, meeting the cutting-edge requirements of industrial and scientific research.

Main Technical Indicators

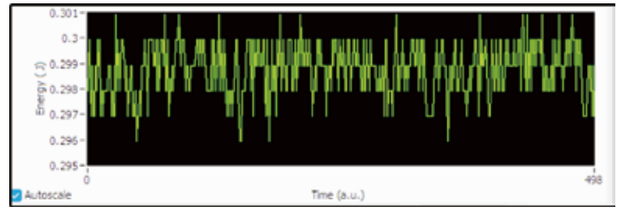
Model	FlapTop-50	FlapTop-150	FlapTop-300	FlapTop-600	KHZ-1
Repetition frequency	100 Hz				10 KHz
Maximum single pulse energy at each wavelength					
1064 nm	50 mj	150 mj	300 mj	600 mj	1 mj
532 nm	25 mj	75 mj	150 mj	300 mj	-
355 nm	15 mj	45 mj	100 mj	200 mj	-
266 nm	5 mj	15 mj	30 mj	60 mj	-
Pulse width (ns)	8-10 ns				
Angle of divergence (mard)	< 1 mard				
Energy stability	< 0.7% @1064	< 1.5% @532	< 2.5% @355	< 4% @266	-
Spot size	5 mm	7 mm	7 mm	9 mm	2 mm
Jitter	＜2 ns				
Polarization purity	⩾99%				
Cooling method	Water				

(1) This system parameter is set as the standard system configuration. We offer comprehensive customer-specific customization services. Contact sales@timetechspectra.com to inquire about your exclusive laser solution.
(2) The cooling method can be adjusted to air cooling based on your requirements.

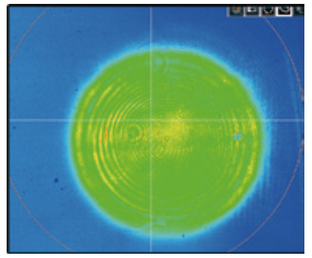
Energy Output Curve



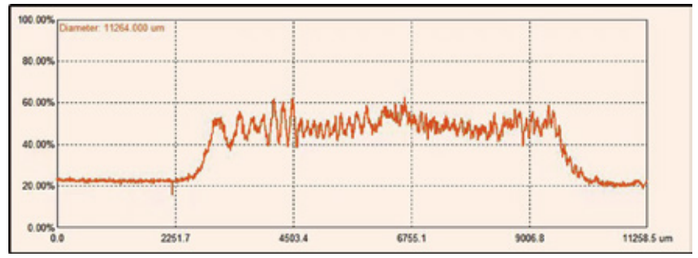
Flat-Top300 Typical Pulse Width



Flat-Top300 Stability Test

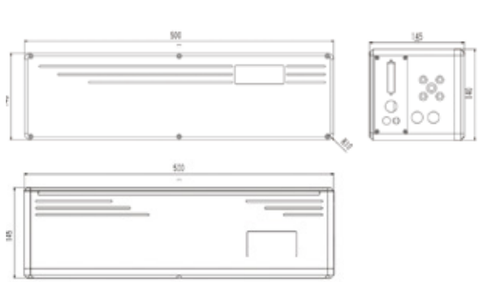


Flat-Top300 Typical Beam Spot

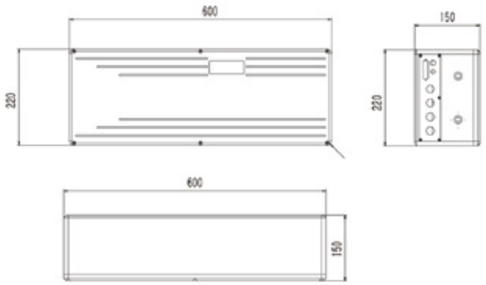


Produced Flat-Top Beam

Equipment Size



Flat-Top300



Flat-Top600

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

High Energy and High Frequency DPSS YAG-OPO Laser

Product Features

- Compact overall: High stability
- Laser repetition frequency: 50Hz
- High energy
- High conversion rate
- Quick wavelength switching
- Flat-top light output
- Stable energy output

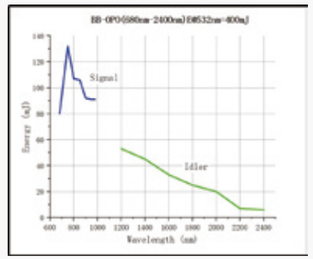
The High Energy and High Frequency YAG-OPO Integrated Machine is an independently developed product by Time-Tech Spectra. It is a diode-pumped Nd:YAG nanosecond pulse laser with exceptional features, including high output energy, high frequency, excellent beam quality, advanced intelligence, compact structure, and easy maintenance. Its high energy output, high repetition rate, tunable wavelength, excellent beam quality, high reliability, ease of integration, and eco-friendly, energy-saving features make it an ideal choice across various fields.

Main Technical Indicators

Model	FlatTop-OPO-532	FlatTop-OPO-355
Wavelength		
1064 nm	600 mj	300 mj
532 nm	300 mj	150 mj
355 nm	–	100 mj
OPO Tuning Range		
SW	680 - 900 nm	420 - 700 nm
IW	1200 - 2400 nm	720 - 2300 nm
OPO Peak Energy		
Signal	> 100 mj @760 nm	> 15 mj @450 nm
Idler	> 50 mj @1250 nm	> 7 mj @850 nm
Pulse repetition rate	50 Hz	
Pulse duration	5-10 ns	
Dimensions		
Main Body	364*550*744.4 mm	

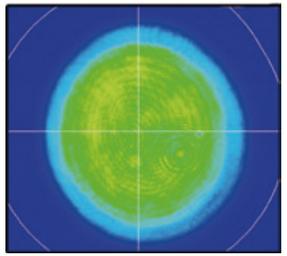
*(1) This system parameter is set as the standard system configuration. We offer comprehensive customer-specific customization services. Contact sales@timetechspectra.com to inquire about your exclusive laser solution.
*(2) This device supports fiber-coupled output.

Energy Output Curve

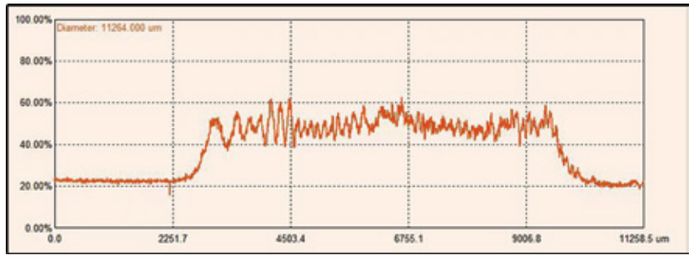


680-2400 nm Energy Curve（532 Pump）

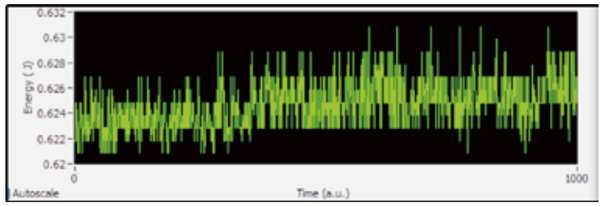
Actual Measurement of Laser



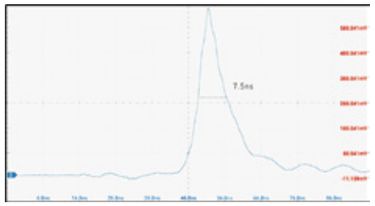
YAG-OPO integrated machine flat-top light spot



YAG-OPO Flat-top beam spot curve of an integrated system

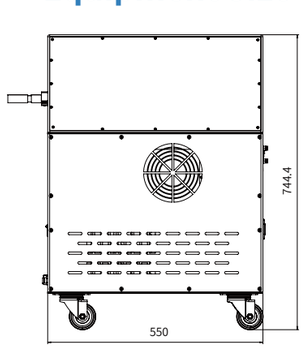


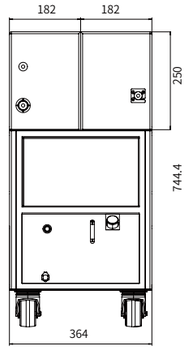
The measured relative standard deviation is as low as 0.306%

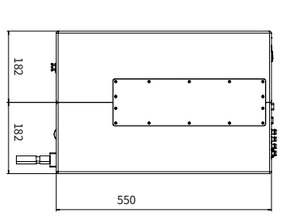


Typical Pulse Width

Equipment Size







Precision Matching Series | Semiconductor Optical Testing Series | High-speed Camera Series | Laser Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

06

Semiconductor Optical Testing Series

01

Non-Destructive Optical Inspection of Dislocation Defects in SiC Substrate Wafers and Ingot

02

Carrier Lifetime Imaging System for SiC Epitaxial Wafers

03

Comprehensive Testing and Analysis System for Perovskite Solar Cells

04

Micro LED Wafer-Level Comprehensive Testing System

Non-Destructive Optical Inspection of Dislocation Defects in SiC Substrate Wafers and Ingot

Automated Multi-Compartment Version

Manual Version

Product Features

- Designed specifically for SiC substrate wafers and ingot
- Non-destructive optical inspection to replace destructive KOH etching method
- High speed detection: < 15 min. per 6' wafer (typ.)
- AI-enabled accuracy BPD, TSD, TED Identification with > 90%
- Compatible wafer size and type: 4'/6'/8'; conductive and semi-insulating

Carrier Lifetime Imaging System for SiC Epitaxial Wafers

Automated Multi-Compartment Version

Manual Version

Product Features

- High imaging speed
- High spatial resolution
- Precise measurement of carrier lifetime
- Switchable Excitation wavelengths for bulk and surface detection

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Comprehensive Testing and Analysis System for Perovskite Solar Cells

Online Version

Offline Version

Product Features

- Compatible with different cell sizes:
  10 cm*10 cm, 30 cm*30 cm
- Integrates with multiple testing methods
  Bright-field imaging/PL imaging/EL imaging/Optical voltage (current) imaging
  Fast and highly accurate AI defect recognition imaging
- Testing time <30 s (10 cm*10 cm), and the spatial resolution is 10 μm.
- Optical voltage (current) imaging indicators
  Testing time <10 minutes (10 cm*10 cm), and the spatial resolution is 20 μm/100 μm.

Micro LED Wafer-Level Comprehensive Testing System

Product Functions

- Testing wafer size: 4'
- Measuring uLED type: RGB
- Bright-field/PL testing type: Bright field defect analysis, electrode defect analysis, PL defect analysis
- EL electrical testing items: V-I curve, IR1/IR2/IR3, VF1/VF2/VF3
- EL colorimetric testing items: Cx, Cy, WLD, and EQE
- PL/AOI testing speed: 10 min/pcs (4')
- EL testing speed: 1.5 s/die to die

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

TTS Precision Matching Series

Fully Automatic Optical Path Alignment Module

System Parameters

Detection Wavelength	350-1100 nm
Adjustment Method	Piezoelectric Ceramic
Lifespan	⩾1 Billion Steps
Sensitivity	0.7 μrad
Adjustment Range	±5°
Additional Features	Power-off Retention Proprietary Control Software

Smart Auto- Calibrate Optical Delay Line

System Parameters

Travel Range	300 mm
Time Window	8 ns
Time Resolution	14 fs
Maximum Speed	400 mm/s
Drive Motor Type	Linear DC Brushless Motor
Calibration Time	3-5 min
Minimum Calibration Step	0.1 μm
Calibration Accuracy	0.7 μrad
Adjustment Range	±5°

External Harmonic Generator

Offers outputs at 515/343/258/206 nm
Simple selection of active harmonics
Synchronous or switched output
Optional manual or automatic switching versions available

System Parameters

Maximum Pump Power	20 W
Pump Energy	8-400 μj
Available Output	515/343/258/206
Polarization	Linear、Horizontal Direction（2H、5H） Linear、Vertical Direction（3H、4H）
Conversion Efficiency	＞40% 2H
	＞20% 3H
	＞10% 4H
	＞6% 5H

High-stability Linear Translation Stage

· 16-bit intelligent PID algorithm, perfectly achieving automatic adjustment under complex working conditions.

· Plug-and-play, with intelligent recognition and automatic control, remote PC operation is compatible; optional joystick control.

· Supports internal programming and computer program downloads, enabling offline independent control.

· Provides interfaces and program for convenient user customization.

· Direct drive by linear motor, eliminating backlash and ensuring high precision.

· Non-contact magnetic drive, wear-free, long lifespan.

· Position memory function, no jitter upon power-on, no need for homing, ensure continuous operation.

· Fast positioning and high dynamic response.

Parameter

Travel Range	300 mm
Maximum Speed	400 mm/s
Maximum Acceleration	10000 mm/s²
Bidirectional Repeat Positioning Accuracy	±0.25 μm
Maximum Load Capacity	3 kg
Minimum Step Size	0.1 μm
Straightness / Flatness	±4 μm
X-Axis Deviation	±100 μrad
Y-Axis Deviation	±150 μrad
Weight	6.3 kg
Drive Motor Type	DC Linear Brushless Motor
Average Thrust	15 N
Peak Thrust	30 N

Optical Accessories

Motorized Flip Mirror

Motorized Filter Wheel

Micro Magnetic Stirrer

Precision Matching Series | Semiconductor Optical Testing Series | Laser Series | High-speed Camera Series | Non-linear Optics Series | Fluorescence Spectroscopy Series | Transient Absorption Series

Our Advantages

ONE

Expertise

We have three R&D centers in Dalian, Hangzhou, and Nanjing. The leaders of these R&D projects have many years of postdoctoral experience in the field of ultrafast time resolution. Renowned experts in related fields in China serve as technical consultants, bringing extensive experience in spectral research and development. Our research capabilities are pioneering in the industry.

TWO

Modularization

The product features a multifunctional modular interface, allowing for flexible integration of functional modules based on user needs. This ensures the most economical combination of products tailored to customer requirements.

THREE

Customization

With powerful software control and development capabilities, we can thoroughly consult with customers to understand their personalized research requirements. This allows us to offer customized development, testing, analysis, and simulation functions tailored to their specific research needs.

FOUR

Post-sales servive

Post-sales maintenance engineers have more than 5 years of product maintenance experience. They quickly respond to customers' various issues with product use, achieving high-efficiency maintenance services with fault plan responses within 24 hours and on-site fault resolution within 48 hours.

Patent

Application for Invention Patents:	Authorization Patents:	Utility Model Patents:	Transient Absorption Series Related Patents:
8	4	29	13