Specifications and equipment are subject to change without notice or liability on the part of the manufacturer.

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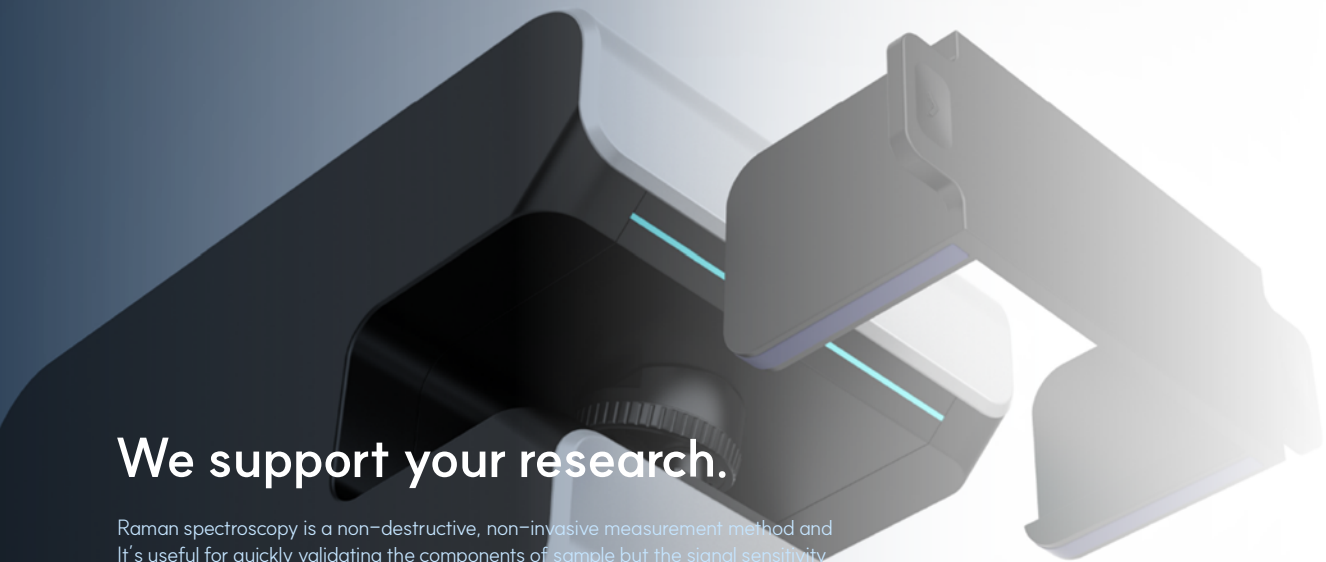
Closer view of the brighter future

Bench-top solution

RAMAN MICROSCOPE

StingRay



We support your research.

Raman spectroscopy is a non-destructive, non-invasive measurement method and It's useful for quickly validating the components of sample but the signal sensitivity of Raman scattering is poor because the low probability of inelastic scattering .

StingRay is developed by optimized compact design to overcome this disadvantage, providing solution to perform full accurate analysis with a maximum ease of use and efficiency.

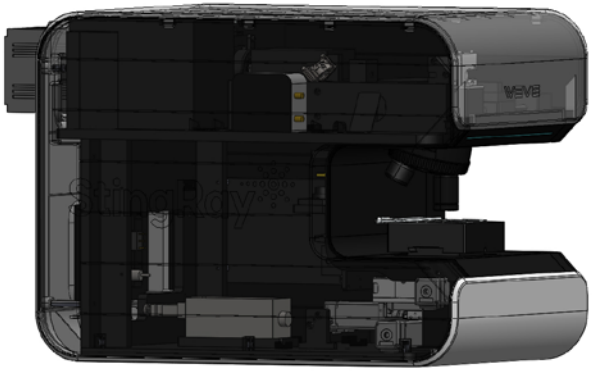
Why StingRay?

StingRay is a compact bench-top Raman spectrometer that integrates the critical elements needed to enable researchers of all skill levels to harness the power of Raman with ease of operation and exceptional sensitivity. The applied spectroscopy is the same technology used in the WEVE MantaRay model, with an aberration-compensated spectrometer to provide maximum reliability with minimal distortion.

Highly efficient spectroscopy in the visible and near-infrared ranges provides superior spectroscopic performance in demanding and challenging applications, while optimal spectral performance with excellent signal-to-noise ratio and photometric performance ensures best-in-class sensitivity.

The spectrometer's lightweight design, high-performance optics, and small footprint make the StingRay a perfect fit for applications that require a low-cost, high-performance Raman instrument in a limited workspace.

Measurement stability



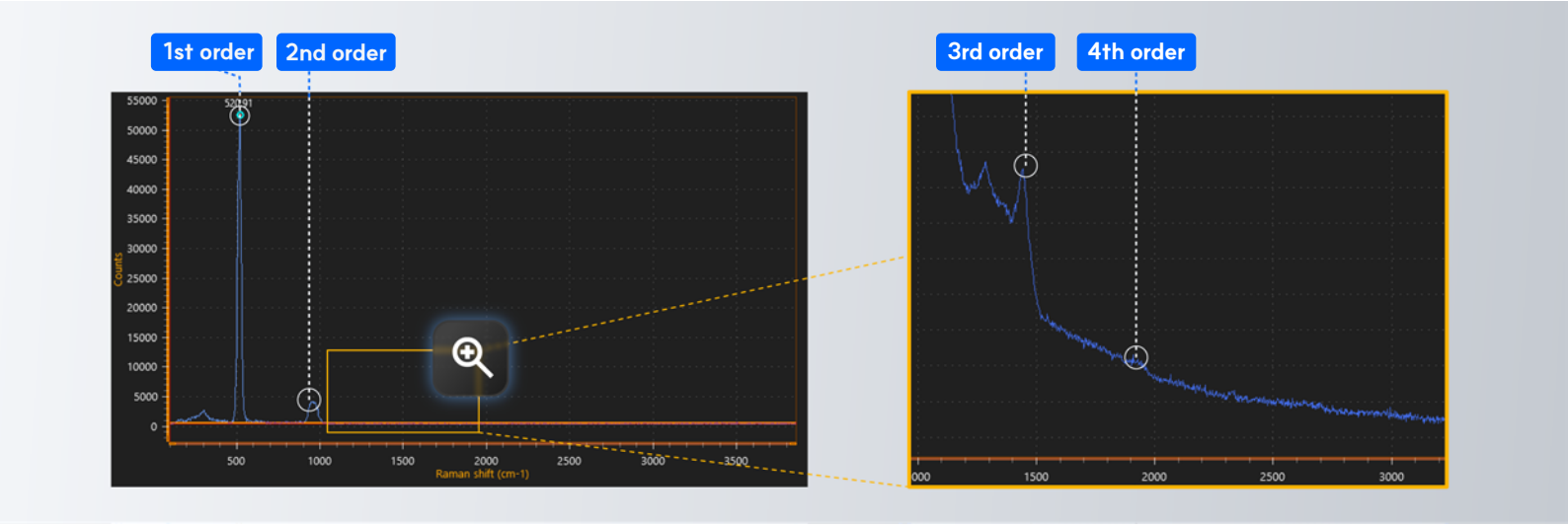
StingRay is equipped with precise optical alignment technology and permanently aligned optics to prevent distortion. Optimized design techniques based on short optical paths help users to avoid optical system challenges.

Weve's unique positioning system allows to execute a compact design and ensure longevity of parts as well as provide a reliable operation. Laser status is constantly monitored by build in cameras and sensors.

Highly sensitive

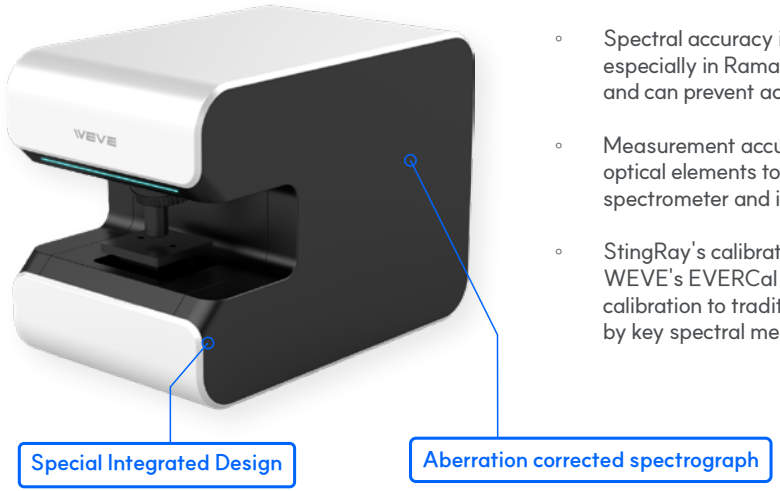
- **Sensitivity Data**

The quarter spectral signal of silicon is a representative way to describe the sensitivity of a Raman spectroscopy system, and the signal above was measured with a standard-grade spectroscopic CCD instrument.



Measurement Accuracy

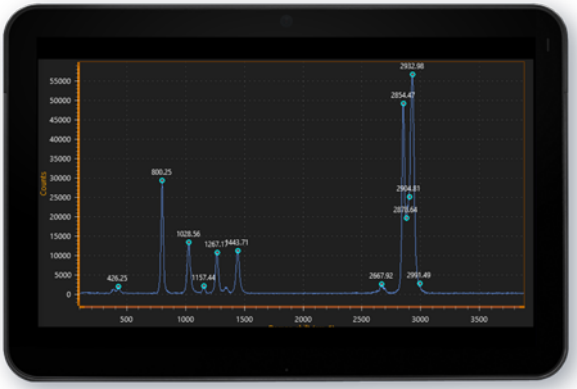
The aberration-compensated spectrometer and patented calibration technology overcome traditional optical and mechanical limitations to improve measurement efficiency and provide superior measurement accuracy. Spectral signal of a neon lamp and dedicated software with calibration algorithms are used to ensure the settings of the spectrometer are consistent.



- Spectral accuracy is the most important factor in spectroscopy, especially in Raman, where a single pixel is a major source of an error and can prevent accurate analysis.
- Measurement accuracy is maintained through precise alignment of optical elements to prevent distortion of the aberration-corrected spectrometer and integrated design for permanent performance.
- StingRay's calibration is based on WEVE's EVERCal technology. WEVE's EVERCal technology provides a fundamentally superior calibration to traditional calibration methods. The accuracy is verified by key spectral measurements of a standard neon calibration lamp.

Repeatability verification DATA

600gr/mm Grating
< 0.1nm/pixel resolution
Average Repeat error : < 0.085nm

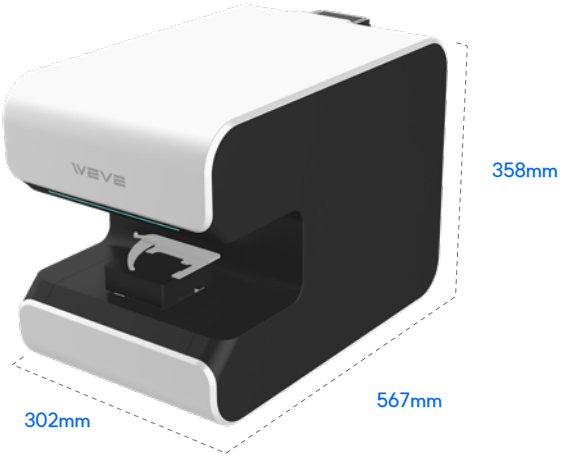


Units (nm)

Reference peak	426.25	800.25	1028.56	1157.44
Maesured (avr)	426.36	800.16	1028.63	1157.39
Error (abs)	0.11	0.09	0.07	0.05
Reference peak	**1267.17**	**1443.71**	**2667.92**	**2854.47**
Maesured (avr)	1267.17	1443.71	2667.92	2854.47
Error (abs)	0.07	0.07	0.09	0.11

This result may vary depending on the measurement environment and conditions

Measurement Advantage



Dedicated controllers

Feature-rich controller for software and microscope control

Compact size & Best performance

Minimized size

- Small dimensions of 302mm (w) x 567mm (D) x 358mm (H) require a space of the size of a regular table to set it up. The Sting Ray is the smallest Raman spectrometer with similar performance and offers high efficiency.

High sensitivity

- Specifically designed and optimized spectrometer ensures high optical efficiency of StingRay.
- The back-illuminated cooled CMOS camera reduces the noise level to acquire signals with relatively high measurement sensitivity.

Confocal design

- High spatial resolution has been achieved by a proper implementation of Confocal techniques.

Budget effectiveness

Despite a relatively low price, StingRay offers basic and essential features for Raman research and Raman studies.

Measurement Advantage

Easy to use

- The whole process from the startup of the system to the measurement is simplified and organized to quickly measure and acquire high resolution Raman signals with minimal distortion and intervention.
- Simple and intuitive measurement software makes it easier to achieve high-quality research results without specialized training.

Convenient install & Move

- StingRay has a simple initial installation process and is free to be moved without professional assistance.
- It is highly reliable and durable, providing stable and trouble-free behavior for mobile installations.

Stable & Safe

- StingRay's integrated design of optics and instrumentation ensures precision and reliability over time.
- A removable enclosure for the sample portion and a laser interlock feature in the software ensure safety without compromising simplicity or convenience.

Darkroom

Simple and detachable darkroom is designed to increase the mobility and simplicity.

Intuitive system status lights

Easily check whether the system is powered by the LED indicator in the front.

Application

StingRay can be used in various research fields such as environment, energy, materials engineering, biomedicine, sensor development, photocatalysis, solar cell development, plasmonic microparticle development, LED inspection, microplastics, carbon dioxide capture & utilization, etc.

Sensing

- Biosensor (SERS)
- Plasmonic biosensor(nano architecture based)
- Polymer– nanomaterial compound
- Micro plastic

Battery & energy

- Organic electrode
- Metal oxide
- Carbon material(graphite)
- Electrolytes (solid, acqueous)
- Polymers / ceramics, metal–alloys
- Solar cell/Photoelectrochemical cell
- Energy storage - carbon capture & utilization

Display

- Graphene, 2D nanomaterial, epi thin film– Micro LED & Nano LED
- Quantum dot / OLED, QLED, PeLED

Catalysis

- Electrocatalysis /metal compound NPs : Chlor–Alkali industry)
- petroleum refinery)
- Battery
- Plastic recycling
- Photocatalyst – Fuel cell

Semiconductor

- SemiconductorSemiconductor Devices (Low–Dimensional, Compound Semiconductors)
- MoS2, WS2, MoTe2, WTe2, MoSe2 / III–V compounds

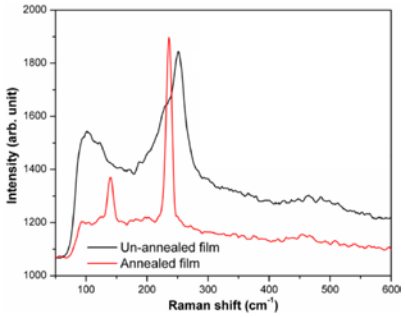
Carbon materials

- Graphene & graphite film – Transparent electrodes/Batteries/Catalysts/Semiconductor devices, Transistors

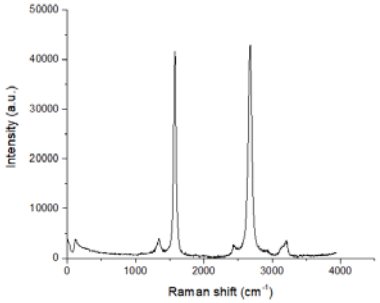
▪ Application spectrum

material

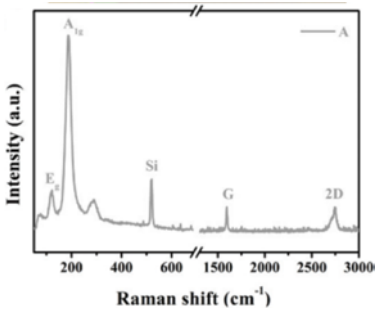
Thin film



CNT fiber



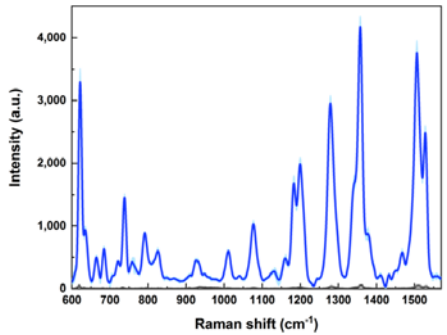
Graphene hetero sturucture



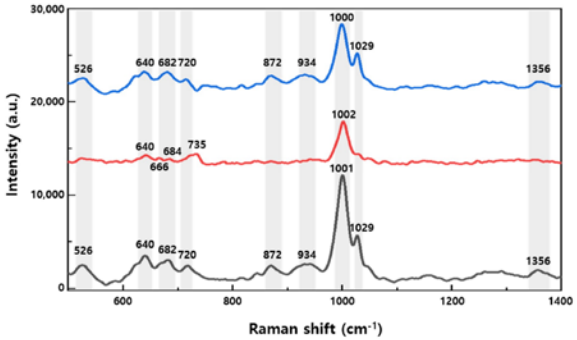
▪ Application spectrum

SERS

Si based(black) vs Nanoparticle

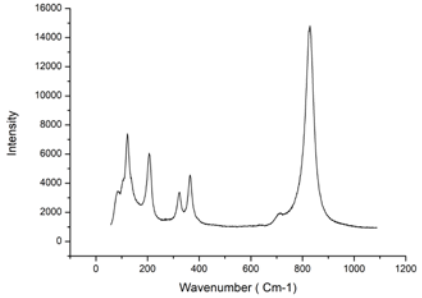


Rat urine on substrate(size effect)



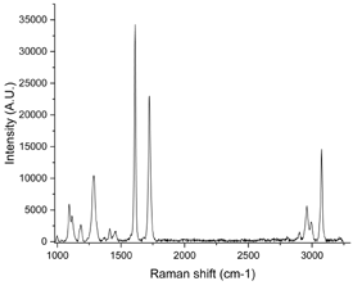
Photoeletrode

BIVO4

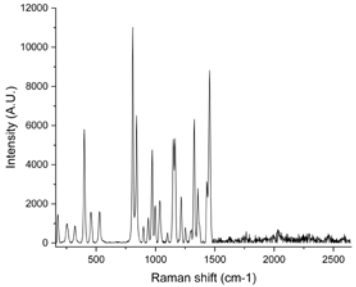


Plastic

PET(Poly Ethlylene Terephthalate)



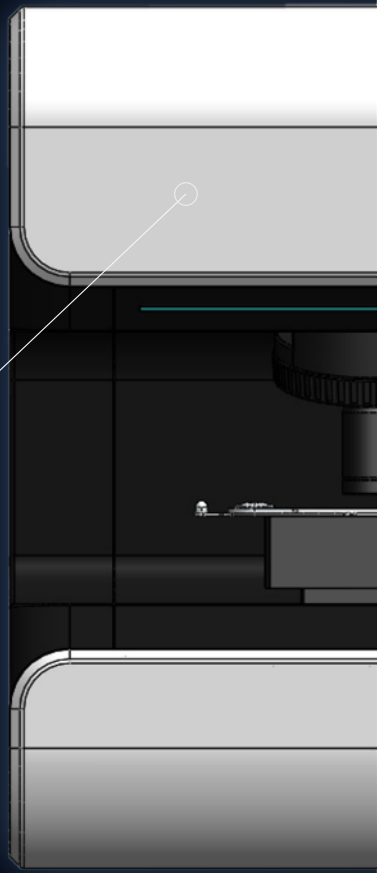
PP(Poly Propylene)



System Configuration

COMPACT AND POWERFUL

Cutting edge research grade Raman Spectroscopy solution of WEVE is ready so support your complicated needs.



01

Spectrometer

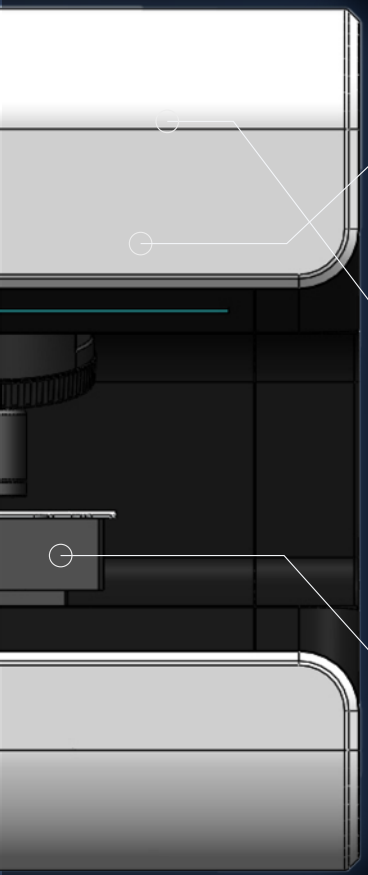
Wavelength range : 400nm~1100nm, , the design is optimized for smooth optical aberration and distortion.

Standard Laser Wavelength : 532, 633, 785nm Single built-in laser

Grating : 600gr (standard) : options available

Spectral resolution : <2.5cm^{-1} / pixels @600gr, 532nm

Spectral range : 100 ~ 3800cm^{-1} (standard 600gr) : the specs are subject to change, depending on the Grating and initial setup.



02

Beam delivery

Low Wavenumber cut-off : <100 cm^{-1}

High Wavenumber cut-off : 4000 cm^{-1} @600gr

04

Detector

Pixel format : 5,472 x 3,648 pixels (raw) : Have 3 x 3 pixel binning for standard options

Detector operating temperature : −15°C (from ambient)

03

Sample stage

Scanning stage : XYZ motorized stage : XY mapping included

05

Applications

Laser illumination : Raman, PL, Upconversion

Microscope image : White light image

06

Control device

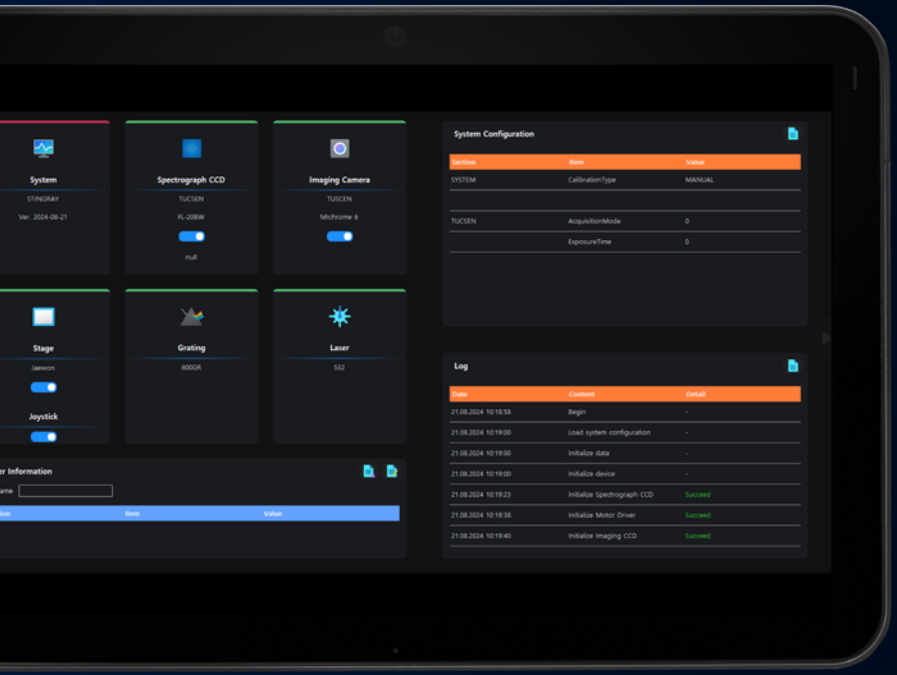
PC controlled : Latest specification Windows

Detailed Specification

Category		Desciption
General Performance	Raman Shift Range	100–3,800 cm^{-1} (standard 600gr/mm)
	Spectral Resolution	<2.5 cm^{-1} / pixels @600gr, 532nm
	Spectral Accuracy	<0.1 nm @600gr
	Spatial Resolution	Around 1um (lateral) /2um (axial) or better laser spot diameter : smaller than 600nm@ 532nm, optimized design for 100x objective lens
	Low wavenumber cut-off	<100 cm^{-1}
	High wavenumber (Max)	4,000 cm^{-1}
	XYZ motorized stage	X : +/- 10mm Y : +/- 10mm Z : +/- 3mm Controller : @Gamepad
Input Light	Wavelength	532, 633, 785 nm(request) Single built-in laser / Requests on other laser line
	Output Power (@aperture)	25mW ~ 100 mW or more
	Mode	Single longitudinal
	Power Stability	1~3%
	Spectral Line Width	0.001 ~ 0.00001 nm

Category		Desciption
Spectrograph	Aberration	Aberration corrected spectrograph
	Focal length	130nm
	Grating	600gr/mm as a standard (1200gr/mm, 1800gr/mm, selectable for order)
	Measurable	400nm to 1000nm by CCD detector
	Scan to scan repeatability	better than 1 cm^{-1}
Detector	Cooling	-15℃
	Data format	1,624 pixel
	Chip size	13.1mm x 8.8mm (7.2 um x 7.2 um)
	Spectral range	400nm - 1,000nm
	Dark noise	0.001e-/pixel/s
	QE	84%@495nm
	Interface	USB interface
Application	Laser illumination	Raman, PL, Up-conversion
	Microscope image	White light image

Control Software : Rays-ON



MAIN UI

- Know the connection status of each device
- Control on-off connections
- Individual user log-in
- Fast and easy maintenance
- Open & save log & config file
- Quick guide attached

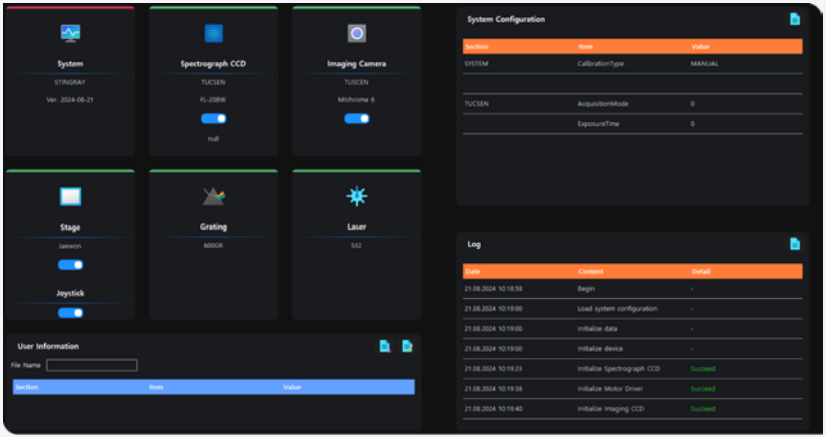
Prepare for convenient measurements

Operating Software & main functionality

Rays-On is a dedicated software developed to help users maximize the power of the small but mighty StingRay.
We focused on making the basic and essential features needed to acquire Raman/spectroscopic data easier and simpler to use from a user perspective rather than a developer perspective.

Self-diagnosis function

Display the 2D spectrum image of the sample by display by depth (based on wavelength, intensity, half-width, integration)



The software self check the status of the system each time the system is launched. All anomalies are recorded and logged.

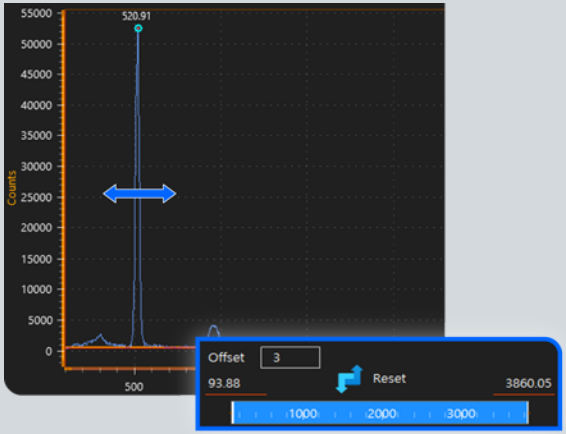
Various data display methods

Region of Interest(ROI) analysis

You can specify individual ROIs of the measured signal to view information on Max intensity value, Wavelength / Wavenumber, FWHM, and Integration.

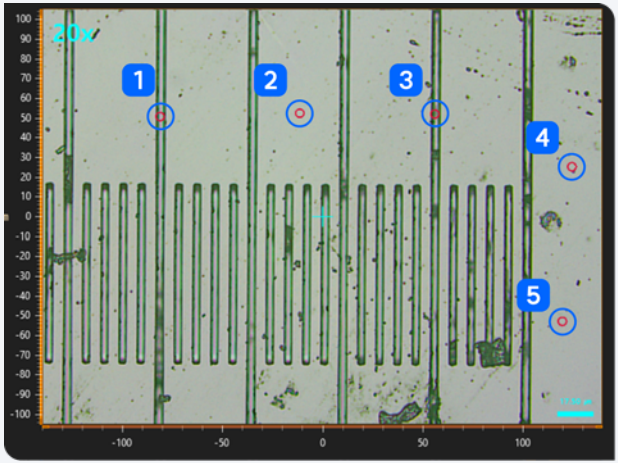
Spectral position Adjust with offset

This feature allows you to manually compensate for measurement errors caused by various factors when measuring signals within a limited range.

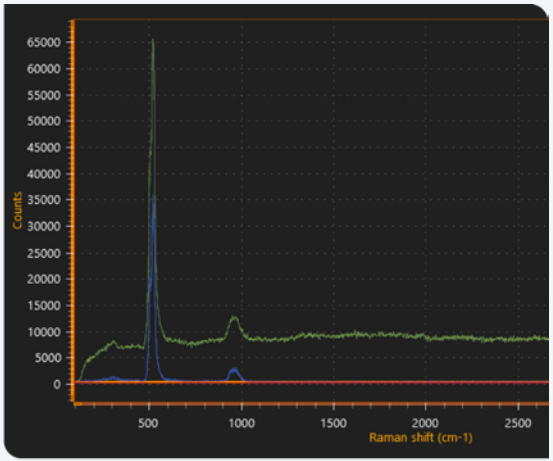


Multi point scan

The system can measure multiple points at once, specified according to preset preferences.



Specifies the point for measurement sequentially on the microscopic image

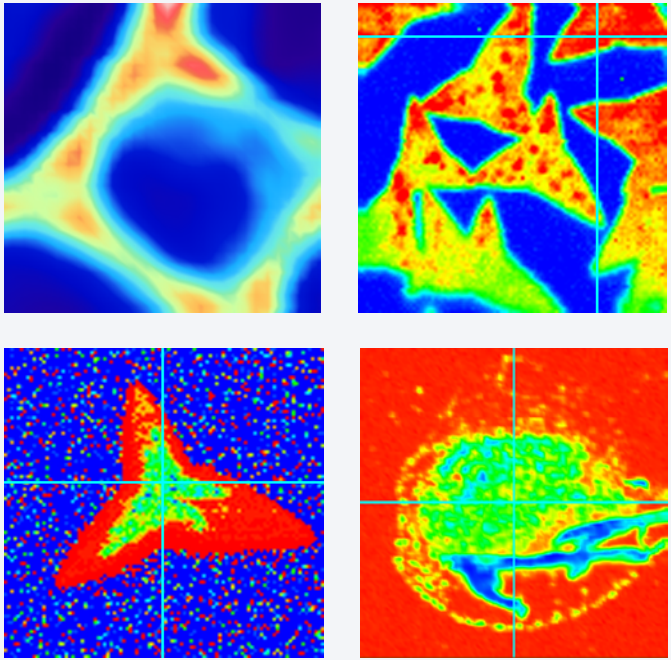


Show the spectrum data measured by set positions.

Data processing and analysis

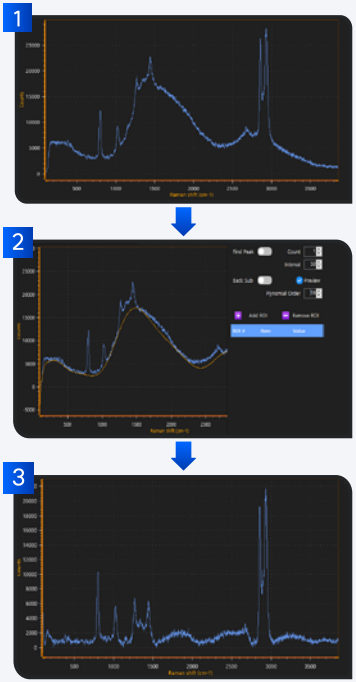
Creative color 2D Mapping

Visualize two-dimensional mapping spectrum data in a variety of colors appropriate to the analysis conditions.



Fitting (Polynomial , Mean difference & manual) and smoothing

background removal



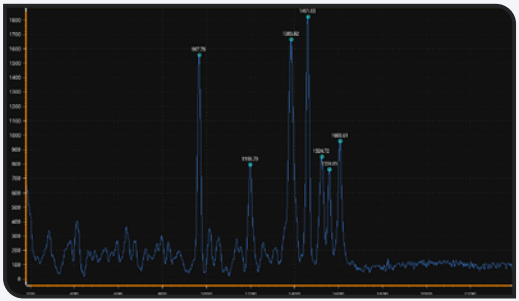
1 Spectrum data (Raw)

2 Set background subtraction value by selcting method and order

3 Removed background data

Find peak

Peak location and information can be automatically tracked based on the preferred settings.



Specify the results by setting Peak Count number and interval period

Dedicated viewer

Dedicated viewer " WeVu "

Data measured with WEVE's MantaRay and StingRay
can be further analyzed using the dedicated viewer WeVu.

1.Back subtraction

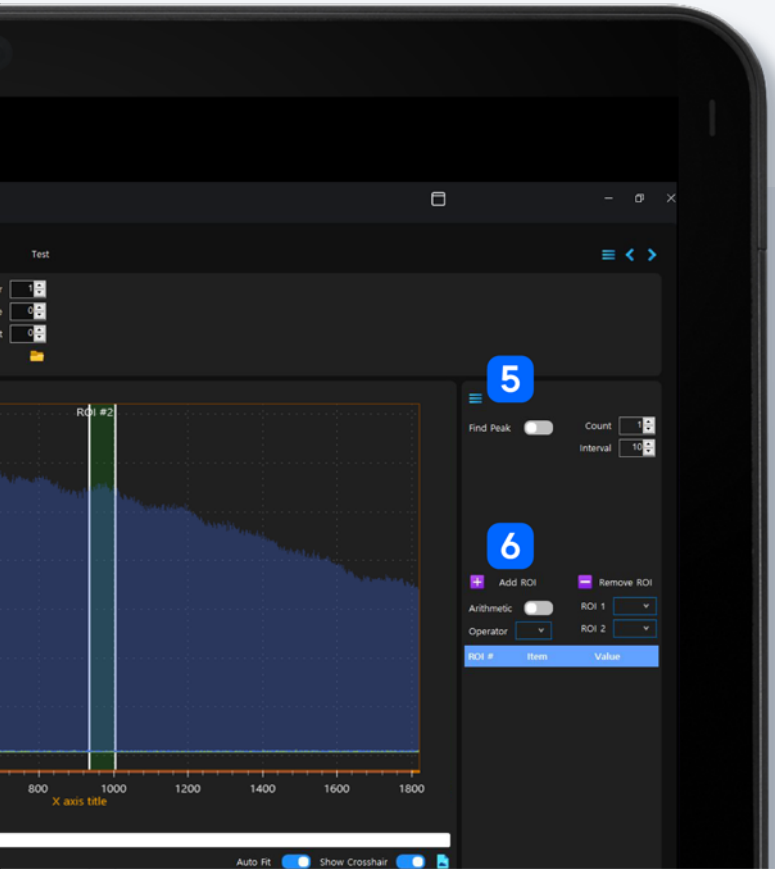
- Polynomial fitting
- Mean difference Eq
- User defined

2.Selectable Data format

- Microscopic image
- Spectra signal
- Mapping image

3.Data display window

- Bright field/Darkfield image
- Single/Multi spectrum
- Color display
- Creative 2D color mapping image



4.Signal processing

- Average
- Mean
- Smoothing

5.Peak finder

- Set peak count number
- Control interval value

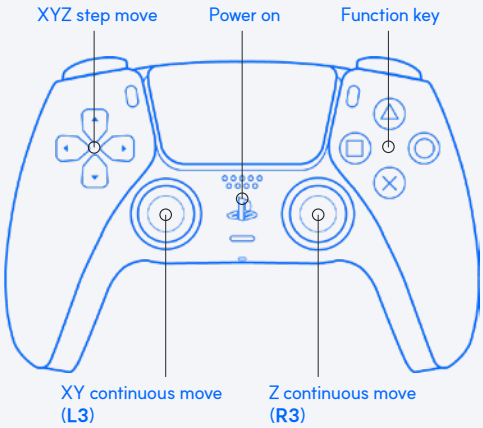
6.ROI analysis

- Max intensity
- Center wavelength (wave numver)
- FWHM
- Integration

Control Software : Rays-ON

Usability and user-friendly controls

- Mouse control : Adjust sample position (Mouse click, right)
- Position save : Save sample measurement location information
- Objective lens position correction : Compensating for position error due to microscope optical lens magnification
- Multi point scanning : Specify measurement positions to save automatic measurements of signals and optical images
- Joystick using game pad : Easy to change sample position with continuous & step movement, provide simple measurements with function keys.



KnowItAll Suite : Analytical Tools & Raman Database

" WeVu " + WILEY

WEVE's WeVu dedicated viewer is fully integrated with Wiley KnowItAll analytical tools, offering advanced analysis capabilities and access to a continuously updated Raman database.

Analytical tools

- Basic Spectrum Analysis
- Advanced Spectrum Search & Mixture Analysis
- Database Building / Management
- Structure Drawing & Reporting (Chem Window)
- Spectrum Processing
- Comprehensive KnowItAll Raman Spectral Library
- Quantitative Analysis Option

Raman data base / 26K+ Spectra

- Raman Consumer Goods
- Raman Controlled & Prescription Drugs
- Raman Flavors & Fragrances
- Raman Inorganics, Materials, Minerals
- Raman Nutraceuticals, Organometallics
- Raman Pigments & Dyes
- Raman Polymers, Forensi
- Raman Polymers & Monomers
- Raman Semiconductor materials

*The KnowItAll Analytical Edition software and Raman database are optionally offered as a bundled package, available through an annual subscription. The WeVu viewer is provided free of charge.

StingRay

Brochure

Specifications and equipment are subject to change
without notice or liability on the part of the manufacturer.

WEVE

Closer view of the brighter future

The images used in this brochure are based on MantaRay rendered images. In addition, the images of the software UI, etc. were created with the actual operating screen of Rays-ON, our in-house developed software. The actual images may differ slightly from the contents of the brochure.

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Webpage shortcuts, ENG

Webpage shortcuts, KR