Lightnovo

Research Grade Pro Spectrometer

Unlock the Low-Frequency Raman and explore what standard Raman spectrometers cannot see

- Reveal intermolecular dynamics invisible to standard Raman
- Distinguish polymorphic and crystalline phases
- Perform non-destructive, fast measurements
- Compact and reliable for both laboratory and OEM integration

Miraspec

Software for PC (Windows 11) and smartphone (Android)

Data acquisition	**Laser power control** **Exposure time control** **Sensor gain control** **Number of repetitions control** **Spectral range control**
Data preprocessing options	**Spike correction** (Whitaker-Hayes, moving window) **Spectral smoothing** (Whittaker, asymmetric least squares, Savitzky-Golay) **Baseline correction** (rolling circle, rubberband, least squares, asymmetrically reweighted penalized) **Spectrum normalization** (Z-score, mean, Mean centre, MinMax, Unit Norm L1, Unit Norm L2) **Spectral super resolution***
Data Exploration	**Principal component analysis** **Non-negative matrix factorization** (SIMPLISMA-NNLS, MCR-ALS)
Qualitative analysis	**Material identification** (Pearson correlation, square Euclidean cosine, square first difference Euclidean cosine) **Compatible libraries** (>20,000 spectra)** **Creation of spectral libraries**
Quantitative analysis	Principal component regression Raman peak height/peak area calibration Partial Least Squares (PLS) calibration
Classification	Random Forest, Linear SVM, AdaBoost, Decision Tree, Hoefding Tree, Naïve Bayes, Perceptron, Softmax Regression

**patented feature*
***various library options available upon request*

Spectrometer system controlled by smartphone or PC via Bluetooth or USB-C cable.

Accessories

- Short/Middle distance probe variable (NA = 0.2, WD = 0-10 mm)
- Long distance probe variable (NA = 0.1, WD = 0-25 mm)
- Contact probe variable (NA = 0.6, WD = 0-200 um)
- Contact probe fixed (NA = 0.6, WD = 10, 50, 100 um, PSF = 10, 15, 20 µm)
- Sample holders
- Axial focusing accessories
- Light protection sample cover
- Power bank

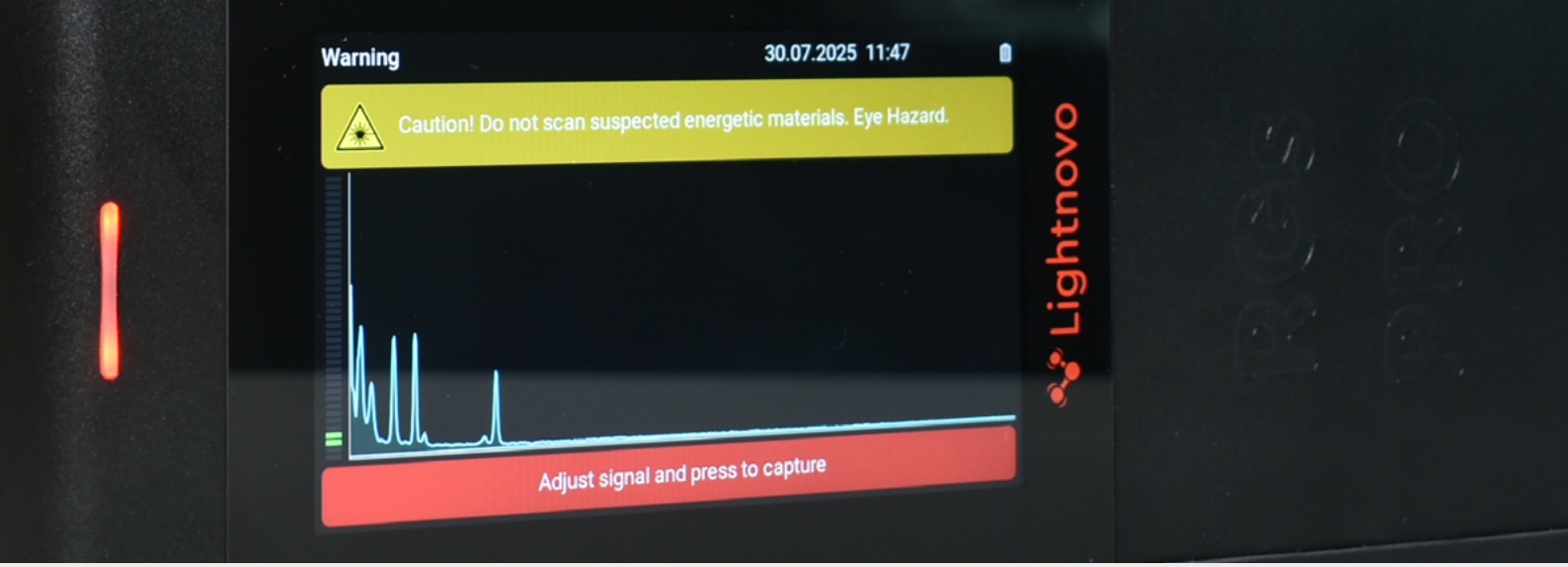
Applications

Pharmaceuticals: crystallinity & polymorphism of APIs and excipients

Biomedical diagnostics: biomolecular interactions and tissue organization

Semiconductors and Nanomaterials: organic & 2D materials, quantum-dot phonon analysis

Industrial and Petrochemical: monitor crystallization or structural transformation during formulation of chemicals and polymers



Technology

The **RG PRO** extends Lightnovo's Raman range below 70 cm^{-1} - reaching the low frequency **(THz -terahertz) range** that reveals *intermolecular and lattice vibrations.* This means direct insight into **crystal structure, phase transitions, and polymorphism** - all within one compact, high-performance instrument.

Why Low-Frequency Raman Matters

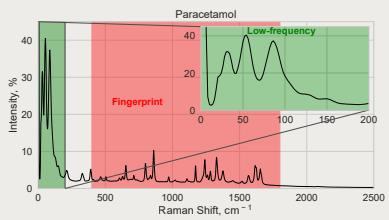
Below 200 cm^{-1} lies the **structural fingerprint** of materials - lattice vibrations, phonon modes, and weak intermolecular forces that determine **stability, crystallinity, and phase behavior.**

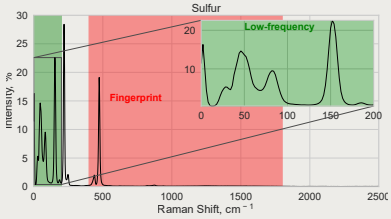
The RG PRO opens this region, delivering **a complete vibrational picture** from 25 to 4000 cm^{-1} in one scan.

Specification

Feature versus model	RG Raman 532	RG Raman 785	RG Raman 830
Laser wavelength	532 nm	785 nm	830 nm
Power on sample*	10-100 mW 0.01-90 mW (LPR)	10-95 mW 0.01-80 mW (LPR) 5->500 mW (Power) 0.01->500 mW (Power LPR)	5-70 mW 0.01-65 mW(LPR) 10->500 mW (Power) 0.1-400 mW (Power LPR)
Spectral Range	38-3700 cm^{-1} 38-2040 cm^{-1} (HR)	25-2500 cm^{-1}	40-2400 cm^{-1}
Spectral Resolution**	4 / 5 / 6 cm^{-1} 2.3 / 3 / 3.7 cm^{-1} (HR)	3 / 4 / 5 cm^{-1}	3 / 4 / 5 cm^{-1}
Signal-to-noise ratio at***	1200:1 1000:1 (LPR) 800:1 (HR) 600:1 (HR LPR)	1000:1 800:1 (LPR) 3000:1 (Power) 2500:1 (Power LPR)	900:1 800:1 2500:1 (Power) 2000:1 (Power LPR)

* *Actual laser power range can differ ± 2 % per device. Please contact us if you need specific laser power range values*
** *Slit size dependent; slit size can be customized (20, 35, 50 µm slits)*
*** *Determined as peak signal-to-noise ratio of polystyrene spectrum at maximal laser power, integration time 0.3s, number of repetitions 10.*





Extra Features

- **Ultra-low-frequency detection to 25 cm^{-1}** for THz-Raman studies
- Simultaneous access to **low frequency** (below 70 cm^{-1}) and fingerprint regions
- **High spectral resolution** and excellent signal-to-noise ratio
- **Multiple laser options**: 532 / 785 / 830 nm
- **Compact and portable** for research or OEM use
- **Compatible with RG microscope**

Contact Details

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About Lightnovo

A spin-off from the Technical University of Denmark, Lightnovo was founded in 2019 by an enthusiastic team united by the goal of revolutionizing the field of Raman spectroscopy through innovative, high-performance solutions. Our mission is to develop and commercialize **“Raman for all: democratize the power of high-end Raman spectroscopy for the benefit of mankind”.**

We aim to provide premium Raman spectrometers and microscopes with the world’s smallest form factors without compromising the performance. With this innovation, Lightnovo addresses the need for portable, reliable field instruments at an affordable price.

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