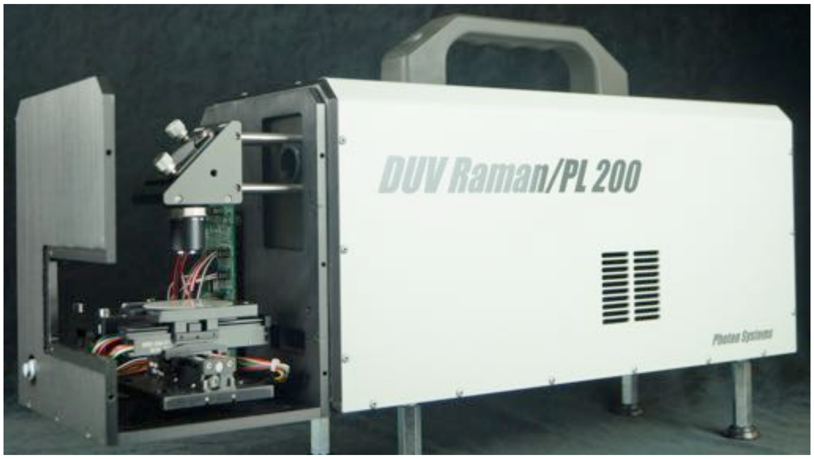

DUV Raman/PL 200

Fully Integrated,
Lab Model
Deep UV Resonance Raman &
Photoluminescence
Spectrometer,
with microscopic imaging

Why Deep UV Spectroscopy?

Deep UV excited Raman & photoluminescence spectroscopy is an emerging analytical instrument technology with vast potential for a wide range of commercial, industrial, and research applications. A major limitation of Raman spectroscopy conducted in the near UV, visible, or near IR is obscuration or interference of the Raman signals due to background fluorescence from the analyte or its background or surroundings within the laser beam interrogation spot. This interference limits the types of materials and compositions or backgrounds for which Raman spectroscopy is useful.

Native fluorescence is a phenomenon which does not occur below about 270 nm for the vast majority of materials, independent of excitation wavelength. Raman, on the other hand, is dependent on excitation wavelength and when excitation occurs below 250 nm, there exists a spectral region within which to observe over 3000 cm-1 of Raman shifted emissions without obscuration or interference from fluorescence.

This is the driving motivation for spectroscopy conducted in the deep UV with excitation below 250 nm. Also, operation in the deep UV enables simultaneous detection of Raman and fluorescence spectra, enabling the much higher sensitivity of fluorescence and the higher specificity of Raman spectra. There are many other advantages of operation in the deep UV including enhanced Raman signal strength due to resonance effects, simplification of Raman spectra for resonant materials making spectra easier to interpret, small depth of penetration into many materials, which limits interference with background or substrate materials, and other benefits.

Deep UV resonance Raman & photoluminescence spectroscopy has been hampered by the lack of a suitable laser source in the deep UV. Photon Systems has developed a new enabling laser technology to address this problem. These lasers have exceptionally narrow and stable emission linewidths and are hundreds of times smaller, lighter, and lower power consumption that other deep UV lasers. Photon Systems lasers have been vetted in a wide range of harsh commercial, industrial, and research and have been selected by NASA for the Mars 2020 lander mission for a rover arm mounted deep UV Raman and fluorescence instrument.

Features

Excitation Wavelength: 248.6nm.

Spectrograph: 200 cm Czerny Turner with dual computer controlled 3600 & 1200 g/mm holographic gratings

Dispersion: 3.85 cm^{-1}/pixel (w 3600g/mm grating)

Resolution: <15 cm^{-1}, 100 μm slit

Entrance Slits: fixed, selectable

Spectral Spread: 400-4000cm^{-1} (3600g/mm grating) 250nm to 650 nm (300g/mm grating) (0.75 nm res)

Detector: 2 stage TE Cooled, back illuminated UV CCD Array

Obj. Lens: 3X, 5X, 15X, 40X DUV achromatic objectives (10 mm entrance aperture diameter)

Context Imaging Camera: 2.4 M pixel

FOV: 1.3mm, 267μ, 100μ

Motorized Position/Mapping Stage: shown

Overall Size: 7.0" W x 7.3" H x 15" D

Weight: <20 lb

Power Consumption:

Standby	8 W
Full power	60 W

Input: 85VAC to 270VAC or 24 VDC

Safety: Class I, DHHS/CDRH

Command & Control: internal microprocessor computer for data collection, processing, chemometrics, and storage and control/display via Bluetooth to Android phone or external computer.

Patents: U.S. Patents 6,278,869, 7,800,753, 8,395,770, plus pending.

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