

Raman Spectroscopy System

DynaCool (D760) / PPMS (P760) / VersaLab (V760)

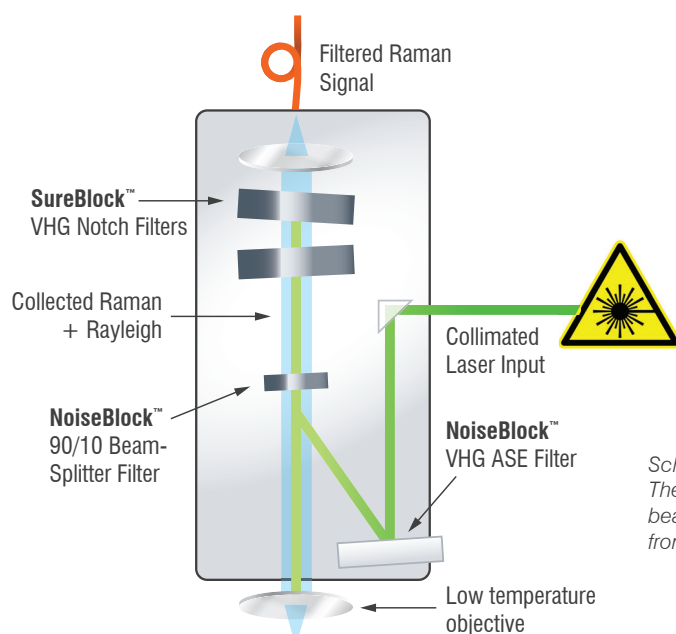
Working in conjunction with the Optical Multi-Function Probe (OMFP), the Raman Spectroscopy Option enables Raman spectra to be collected as a function of temperature and/or magnetic field. The electrical access of the OMFP enables correlative spectroscopic/transport measurements to be made using a single integrated system, all controlled from the MultiVu software interface. The system is suitable for basic structural identification, but also allows for advanced probing of a particular observed mode; the incident beam is linearly polarized and the returning signal automatically separated into two orthogonal polarization channels for subsequent analysis.

Key Features:

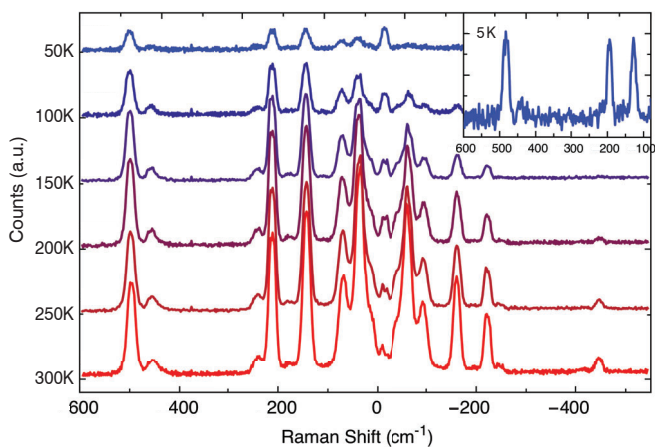
- *i*Vac spectroscopy camera features Low Dark Current Deep Depletion (LDC-DD) technology for superior noise performance compared to other back-illuminated CCDs
- Other Andor gratings are easily installed for more customized applications; software automatically identifies the new grating using a built-in RFID tag
- Automated internal alignment simplifies signal strength optimization
- Spectrometer, laser source, and OMFP positioners are all controlled through MultiVu and have corresponding sequence commands available for automated data collection



The Raman head unit, containing the necessary optical elements for collecting Raman spectra, integrates seamlessly with the OMFP's optical microscope. Both are mounted on a singletip-tilt stage to facilitate proper laser alignment.



Schematic view of the optical elements comprising the Raman head unit. The filters and splitter are configured to deliver a maximal intensity of excitation beam (shown in green) to the sample while also blocking the same wavelength from entering the spectrometer (to better resolve the Raman signal, shown in blue).



Raman spectra of sulfur using Optical Multi-Function Probe (OMFP) in PPMS and DynaCool. Main plot shows data taken in PPMS at temperatures from 300 to 50 K. Inset shows data taken in DynaCool at base temperature with background removed for clarity.



Andor Kymera 193i spectrograph with included iVac 316 CCD.



The Kymera's dual-grating turret, shown here, can be easily removed and replaced with optional gratings to achieve the required spectral bandwidth or resolution required. Integrated RFID tags allow for easy identification of a grating in the MultiVu software.

Raman Spectroscopy Specifications

Temperature [T]

Range*: 350 to 5 K (DynaCool, PPMS)
350 to 50 K (VersaLab)

Exciting Radiation

Wavelength: 532 nm
Laser Power: 75 mW at sample; typical

Spectrometer

(Andor Kymera 193i)
Focal Length: 193 mm
Aperture: F/3.6
Included Gratings: 300 l/mm and 1200 l/mm; 500 nm blaze, Al + MgF₂ coating
CCD Camera (iVac 316): 2000 × 256 pixels, 15 × 15 μm sq.

Operational Range: 0 to 16 T

*Base temperature of 5 K represents the minimum achievable stable temperature under 10 mW of radiant flux

Specifications are subject to change without notice.