

Item: Confocal Raman spectrometer

Qty: 01 unit

Two part bid (technical & commercial) are invited for the supply, installation and performance demonstration of a fully integrated and computer controlled **confocal Raman spectrometer** at **Manipal University Jaipur** with capabilities of recording Raman spectrum and Raman imaging. The Spectrometer should use a confocal microscope, transfer and filtering optics, an achromatic spectrograph equipped with gratings, multichannel detector, lasers and relevant software and computer platforms and should be directly coupled. The supplier must submit a compliance statement for features of the quoted model in the format given below as per mentioned technical specifications.

Sl. No.	Description	Specification	Compliance (YES/NO)	Improvement /Deviation (if any)
	Spectrometer	<p>A large focal length (250 nm or higher) Czerny-Turner type achromatic spectrograph equipped with a research-grade microscope capable of producing Raman (wavenumber transfer 50 to 4000 cm^{-1}) and PL (330 nm to 1.7 microns).</p> <p>a) Spectral Range of spectrometer: 200 nm – 2200 nm with throughput more than 30%</p> <p>b) Scanning step size for 2D mapping to be better than 50 nm</p> <p>c) Spatial resolution: better than 2 microns for axial and 1 micron for lateral direction</p> <p>d) All the lasers should air cooled for maximal confocal performance and TEM00 mode. The laser intensity of all lasers should be controllable to change the intensity from 0 to 100% using neutral density filters or other mechanism with minimal of 10 steps or more.</p> <p>e) Reproducibility i.e. scan to scan to repeatability shall be 0.05 cm^{-1} or better for minimum 25 measurement.</p>	<p>YES/NO</p> <p>YES/NO</p> <p>YES/NO</p> <p>YES/NO</p> <p>YES/NO</p> <p>YES/NO</p>	
	Lasers	Motorised switching between laser and white light sample images using integral video. Further, laser	YES/NO	

		<p>switching must be computer-controlled without any need for realignment. See below for the minimum specification requirement for each laser wavelength.</p> <ol style="list-style-type: none"> 1. 325nm He-Cd Laser with minimum output power of 25mW or more with Raman range from 150cm⁻¹ and resolution should be 2cm⁻¹ or better. Appropriate Laser filter and Edge filter for Raman measurement should be provided. 2. 532nm air cooled frequency doubler Nd:YAG laser with minimum output power of 100mW or more with Raman range from 50cm⁻¹ and resolution should be 0.5cm⁻¹ or better. Appropriate Laser filter and Edge filter for Raman measurement should be provided. 3. 785nm air cooled laser diode with minimum output power of 100mW or more with Raman range from 50cm⁻¹ and resolution should be 0.5cm⁻¹ or better. Appropriate Laser filter and Edge filter for Raman measurement should be provided. 	<p>YES/NO</p> <p>YES/NO</p> <p>YES/NO</p>	
	Gratings	<p>600gr/mm, 1200 or 1800gr/mm and 2400gr/mm gratings</p> <p>Grating efficiency curve should be provided with the technical specifications.</p>	YES/NO	
	Microscope and Objectives	<p>High stability research-grade microscope with high resolution colour camera and directly coupled to the spectrometer. Reflected light illumination must be available. It should include high throughput achromatic coupling optics optimized to work from UV to NIR with maximum efficiency.</p> <p>Following objectives should be provided.</p>	YES/NO	

		<ol style="list-style-type: none"> 1. 15X NUV objective, NA = 0.32, WD = 8.5 mm 2. 40X NUV objective, NA = 0.50, WD = 1 mm 3. 5X visible, NA~ 0.1, WD~ 19.6 mm 4. 20X visible, NA~ 0.25, WD~ 10.6 mm 5. 50X LWDVIS objective, NA~ 0.50 compatible with heating cooling stage 6. 100X visible, NA~ 0.9, WD~ 0.21 mm 7. 63Xwater immersion objective, NA~0.9, WD~2.2 mm 		
	Confocal coupling optics	<p>Confocal coupling optics between the microscope and the spectrometer:</p> <ol style="list-style-type: none"> a) A continuous software adjustable confocal pinhole/slit/any aperture, from several microns to 1 mm should be provided. b) Coupling optics to focus the Raman beam on the entrance slit of the spectrograph should be provided. 	YES/NO	
	Detector	<p>spectrometer should have the option of supporting additional detectors to be mounted simultaneously, for future upgradation</p> <ol style="list-style-type: none"> a) Spectral Range: 200nm to 1050 nm or better b) Cooling Type: Peltier cooled to -60 deg C or better c) Pixel Format: Minimum1024x256 d) Pixel Size: 26x26 microns e) Quantum efficiency (QE): more than 40% from UV to NIR 	YES/NO	
	Mapping Stage for Upright Microscope	<p>Motorized XY (X = 50 mm - Y = 50 mm) or better and motorized Z device stage to be controlled by software. XY specifications: repeatability $\leq 1 \mu\text{m}$; accuracy $\pm 3 \mu\text{m}$; resolution (minimum step size) = 10nm. Z specifications: resolution (minimum step size) = 0.01 micron. Should include positioning joystick, an external controller, software package and Raman autofocus capability. Motorized XYZ</p>	YES/NO	

		stage should come with high-speed Raman Mapping mode for fast Mapping applications.		
	Polarisation Capability	The instrument should be capable of doing polarisation dependent Raman measurements	YES/NO	
	Sample type	Films, powders, liquids. Preferably the system could examine sample size of 20 mm x 20 mm, 5 to 10 mm height.	YES/NO	
	Calibration	Silicon sample should be provided for intensity correction. S/N ratio for 3 rd order (1440 cm ⁻¹) band should be better than 20:1 and for 4 th order (1940cm ⁻¹) band should be better than 4:1. Neon light source for auto calibration of wavelength should be provided.	YES/NO	
	Power meter	Should measure 100 micro watts to 2 watts with 10 micro watt resolution, capable of measuring from 200 to 1060 nm	YES/NO	
	Computer	Computer of latest configuration compatible with the Raman system should be provided with a preloaded software. Minimum of the dual-core 10 Gen processor, 16 GB RAM, Graphics card for 3D viewing, DVD-RW, 2 TB HDD, 2 USB 3 ports, Windows 10 (64 bit), 24-inch LED color monitor.	YES/NO	
	Software:	Should be available on a minimum of 3 computers for remote analysis of data. Capable of collecting and performing full Raman and PL data analysis, including background removal, peak fitting, averaging, etc., fully integrated with all motorized stages of the spectrometer and XYZ mapping stage.	YES/NO	
	Heating-cooling stage for Variable Temperature Measurement or	Micro thermometric cell working from –196°C to 600°C should be provided. Water cooled stage body for high temperature measurements and LN2 cooling device for low temperature measurements	YES/NO	

Terms and Condition:

1. Any other accessories apart from the mandatory accessories and systems mentioned above should be informed and should be quoted separately.
2. Required UPS and anti-vibration table (5ft x 8ft x 4inch) for future upgradation with AFM and laser system should be quoted separately

3. Warranty:

Minimum **three year (not including the down time)** on-site Warranty / Guarantee for entire offered configuration from the date of complete and satisfactory installation of the equipment against the defect of any manufacturing, workmanship and poor quality of the components.

4. **AMC:** AMC (annualized) for 36 months after completion of standard warranty period should be quoted as optional item.

5. **Pre-installation requirements:** Necessary pre installation advice such as room size, required power rating, utility requirements are to be stated clearly, and to be verified /surveyed by the supplier at the installation site. It is the supplier's responsibility to clearly provide details of the above-mentioned requirements before delivery of the equipment. Once the site has been made ready, the vendor must visit the site to check the suitability for installation and give written confirmation that the pre installation site requirement is acceptable to them.

Necessary environmental requirements, i.e., temperature, humidity etc. during the operation of the system should be specified clearly.

6. **Installation & Training:** The satisfactory free installation to the full specifications of the machine with all accessories should be ensured. Institute will provide only space and electrical connection. The installed system shall be performance tested at MUJ premises in accordance with the tender specification as well as those claimed by manufacturer.

On-site one week training for operation and application to be given to the users free of cost. The institute will not bear any training or living expenditure of the supplier in this regard.

7. Consumables & Toolkit:

Consumables and other items required to handle the system while operating all measurement options of the machine, must be quoted for enough quantity for uninterrupted operation of the machine for at least FIVE years. Standard tools kit should be provided for general maintenance services.

8. Documents required:

Operation manual and service manuals should be provided (electronic and Hard copy)

- (i) Vendors should have minimum 15 installations in reputed institutions in India. A list of at least 5 users with complete contact details in India where the same equipment in this document has been sold (in the last three years) or is under operation should be provided. Prospective vendor should clearly mention the type of measurement options (along with the main system) supplied to these institutes.
- (ii) Related PO's of the quoted model supplied to the most recent user site should be provided.
- (iii) The BIDDER shall assure the supply of spare parts after warranty is over for maintenance of the equipment supplied if and when required for a period of 10 years from the date of supply of equipment on payment on approved price list basis.
- (iv) Service response time, turn-around time & up-time of the equipment should be clearly specified in the bid. The bidder also must agree and issue a certificate stating that technical query will be responded within 2 working days and the onsite support will be provided within 07 working days from the date of reporting of the technical failure for down time free operation of the instrument.

9. **Shipment and Clearing:** Price should be quoted for CIP at Delhi/Jaipur airport. The scope/obligation of MUJ while **Shipment and Clearing of the instrument** should also be mentioned.
10. **Note to the bidders:**
- (i) Quotation should be submitted directly by the original manufacturer/supplier or its sole authorized distributor/dealer/Indian Agent. In case of bid by authorized dealer/distributor/Indian Agent, the manufacturer authorization should be attached with the technical bid.
 - (ii) All bidders are hereby advised to quote their latest model to comply with the mentioned specification and the Model quoted should be available on the Vendor's website
 - (iii) The bidder should submit his acceptance against each row as YES/NO and if NO, the bidder should clearly specify the deviations. Features not matching/exclusions – must be clearly indicated. Additional features and features in the quoted equipment which are better than those in the tender – may be clearly explained. The supplier must submit technical brochures and proper application notes adequately explaining and confirming the availability of the features in the model of the equipment being quoted.
 - (iv) Just complying the above-mentioned specifications will not warrant qualifying for the price bid stage. Shortlisting of valid technical quotes will be done before the price bid opening on the basis of technical quality of the quoted components of the system, experimental flexibility, installations in India, indenter's hands-on experience on various systems, user feedbacks etc.