

 <p>IIT PALAKKAD</p>	<p>भारतीय प्रौद्योगिकी संस्थान पालक्काड Indian Institute of Technology Palakkad अहलिआ एकीकृत कैम्पस, कोज़िपारा Ahalia Integrated Campus, Kozhipara पालक्काड- 678557 Palakkad – 678 557</p>	<p>दूरभाषसंख्या/ Phone no: 04923 – 226 300/590/586</p> <p>ईमेल/ Email : purchase@iitpkd.ac</p>
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Prof. Job Kurian
Registrar i/c

Ref : Low and High Temperature Raman Spectroscopy
Date : 23.11.2017

Open Tender No: IITPKD/CIF/JB/065/2017

Due Date: 14.12.2017 @ 3.00 PM

Dear Sir/Madam,

On behalf of the Indian Institute of Technology, Temporary campus, Palakkad, Quotations are invited for “ **Low and High Temperature Raman Spectroscopy, Raman Imaging and Photoluminescence Measurements Equipment with Accessories**”. The Specifications are given in the Annexure.

Pre-bid meeting – The pre-bid meeting is scheduled to be held on 30.11.2017 at 12 PM at Conference Room, Academic Block, IIT Palakkad.

Technical bid Opening: The Technical bid will be opened on 15.12.2017 at 12 PM at Conference Room, Academic Block, IIT Palakkad.

Instructions to the Bidder

- (i) **Preparation of Bids:** - The tenders should be submitted **under two-bid system (i.e.) Technical bid and Financial bid in separate envelopes**. The technical bid should consist of all technical details along with commercial terms and conditions. No prices should be included in technical bid. Financial Bid should indicate item – wise prices for the items mentioned in the technical bid. The technical and the financial bids should be put in separate covers and sealed. Both sealed covers should be put into a bigger cover. **Bids must either be spiral bound / stapled together. No loose sheets will be accepted. All pages must be numbered.**
- (ii) The Quotations duly sealed and superscribed on the envelope **with the reference No. and due date, should be addressed to the undersigned so as to reach on or before the due date stipulated above.**
- (iii) **Delivery of the tender:** - The tender shall be sent to the below-mentioned address either by post or by courier so as to reach this office before the due date and time specified in the Schedule. The offer/bid can also be dropped in the tender box on or before the due

date and time specified in the schedule. **The tender box is kept in the office of the Academic Block, IIT Palakkad, Ahalia Integrated Campus, Kozhipara, Palakkad-678 557.**

- (iv) **Opening of the tender:** - The offer/Bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and will be examined by a technical committee which will decide the suitability of the bid as per our specifications and requirements. The bidders will be invited for opening of Technical bids. **The Bidder's representative should carry authorization letter from their company empowering them to participate in the Pre-bid and tender opening meetings.** In respect of opening of financial bid, those bidders who are technically qualified only will be called.
- (v) **Prices:** - The price should be quoted in nett per unit (after breakup) and must include all packing and delivery charges indicated separately for each item. **The price indicated should be CIF/CIP Kochi.** The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. The price should be quoted without custom duty. **The custom duty will be paid at concessional rate against duty exemption certificate.**
- (vi) **Agency Commission:** - Agency commission, if any, will be paid to the Indian agents in Rupees on receipt of the equipment and after satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in Tender even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. **Terms of Delivery:** - The item should be supplied to our Institute as per Purchase order. The installation and commissioning should be completed as specified **by us in the attached schedule.**
- (vii) **Acceptance & Rejection:** IIT Palakkad reserves the full right to accept / reject any tender at any stage without assigning any reason.

Yours sincerely,

Registrar, IIT Palakkad

SCHEDULE

Important Conditions:

- 1) The due date for the submission of the tender is **14.12.2017 @ 3.00 PM**
- 2) The offers / bids should be submitted in two-bids systems (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes (separately), transportation, packing & forwarding charges, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers **superscribed clearly as “Technical Bid” and “Financial bid”** and sealed. Both the sealed covers should be put in a bigger cover. Open Tender for **“Low and High Temperature Raman Spectroscopy, Raman Imaging and Photo- luminescence Measurements Equipment with Accessories”** should be written on the left side of the Outer bigger cover and sealed.
- 3) **EMD: -EMD should be at 2% (two percent) of the tender value quoted by the bidder.** The EMD should be enclosed with the financial bid which will not be opened for Technical evaluation. Enclosing the EMD in the Technical bid will automatically DISQUALIFY the tenderer. EMD should be in the form of DD in favour of **“Indian Institute of Technology Palakkad” and payable at Palakkad**”. The tender without EMD would be considered as UNSOLICITED and will be REJECTED. Photo/FAX copies of the Demand Draft/Banker’s pay orders will not be accepted. No interest will be paid for the EMD and the EMD will be refunded to the successful bidder on receipt of Performance Security.
- 4) **Performance Security:-** The successful bidder will be asked to submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD or FD Receipt from the commercial bank or Bank Guarantee from any nationalized bank of India. **Only after submission of Performance Security, Purchase Order/Work Order will be released / L.C will be opened.**
- 5) **Performance Security in the form of Bank Guarantee:-** In case the successful bidder is a foreign company and wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.
- 6) The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

If an Indian agent is involved, the following documents must be enclosed:

- Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
 - Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.
- 7) The offer/bids should be sent only for a system or equipment that is available in the market and supplied to a number of customers. A list of customers in India and abroad with details must accompany the quotations. Quotations for a prototype machine will not be accepted.
 - 8) Original catalogue (not any photocopy) of the quoted model duly signed by the principals must accompany the quotation in the Technical bid. No prices should ever be included in the Technical bid.
 - 9) Compliance or Confirmation report with reference to the specifications and other terms & conditions should also be obtained from the principal.
- 10) Validity:** Validity of Quotation not less than 90 days from the due date of tender.
- 11) Delivery Schedule:-** The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
- 12) Risk Purchase Clause:-** In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.
- 13) Payment:-** No Advance payment will be made for Indigenous purchase. 100% Payment after supply and successful installation and commissioning and certification by the end user. In case of import supplies the payment will be made only through **100% Letter of Credit i.e. (50% payment will be released against shipping documents and 50% after successful installation and meeting acceptance criteria wherever the installation is being done).** Advance payment may be considered on submission of Bank Guarantee equal to the amount of advance payment.
- 14) On-site Installation:** - The equipment or machinery has to be installed and commissioned by the successful bidder within 15 to 20 days from the date of receipt of the **item at site of IIT Palakkad.**

- 15) Warranty/Guarantee:** - The offer should clearly specify the warranty or guarantee period for the machinery/equipment. Any extended warranty offered for the same has to be mentioned separately. (For more details please refer our Technical Specifications).
- 16) Late offer:** - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.
- 17) Loading and unloading charges will be borne by the bidder/Supplier.**
- 18) Acceptance and Rejection:** - I.I.T. Palakkad has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.
- 19) Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**
- 20) Disputes and Jurisdiction:** - Any legal disputes arising out of any breach of contract pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Palakkad in Kerala.
- 21) All Amendments, time extension, clarifications etc., will be uploaded on the institute website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.**

Acknowledgement:- It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

**SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE**

**TENDER SPECIFICATIONS FOR THE PROCUREMENT OF LOW TEMPERATURE RAMAN AND
PHOTOLUMINESCENCE SPECTROMETER
INDIAN INSTITUTE OF TECHNOLOGY - PALAKKAD**

Prospective vendors should quote for supply, delivery, installation, testing and Commissioning with a list of other accessories required for complete and smooth installation and uninterrupted operation of the equipment. The technical offer should also include make and model number of facilities such as microscope, LASERS, optical components (objectives, filters, polarizers, mirrors, lenses and others), optics for interfacing with heating and cooling stages etc.

The complete spectrometer system should have following specifications.

A. Raman Spectrometer:

A large focal length (350 mm or more) Czerny-Turner type achromatic spectrograph equipped with research grade confocal microscope and reflective optics capable of producing Raman Spectra in the spectral range of 10 cm^{-1} (or less), to 5000 cm^{-1} (or higher) using necessary optics (Rayleigh cutoff and other filters) for at least 532 nm and 633 nm laser excitation sources.

A1. Spectral Range (Excitation wavelengths): 200 nm (or less) – 2100 nm (or higher),

A2. Spectral resolution: $\sim 0.5\text{ cm}^{-1}$ (or better) with suitable optics,

The Vender should specify with suitable optics and gratings to achieve best spectral resolution for various excitation lasers.

@ 325 nm wavelength

@ 532 nm wavelength

@ 633 nm wavelength

A3. Spatial resolution: 500 nm or better. The system should be optimized for 100x objective lens measurement.

A4. Gratings: Holographic gratings with 600, 1800 and 2400 gr/mm mounted on a motorized turret driven and controlled by software. The grating mount should be capable of holding at least two or more gratings at a time. The gratings should be quickly and easily interchangeable without realignment.

A5. Include Rayleigh scattering filters

A6. The low wave number cut-off for all LASERS preferably should be 50 cm^{-1} or lower and down to 10 cm^{-1} (or lower) for LASERS 633 nm and 532 nm with suitable optics. The technical quote should provide the details about the edge and notch filters for ultra-low frequency for Raman measurements down to 10 cm^{-1} (or lower). Vendor should also specify lower range of spectrum for each LASER with suitable optics.

A7. Spectral calibration should be automated. Vendor should provide the specific details in the technical documents if the calibration reference is built-in with the system.

A9. Suppression of Fluorescence: The machine should have fluorescence rejection mode for all laser lines.

A10. Spectra Repeatability: should be 0.1 cm^{-1} (or lower)

A11. Spectra Scanning Linearity: $< 0.5\text{ cm}^{-1}$ or better

B. Lasers:

All the lasers should be air cooled for maximal confocal performance.

All the LASERS should be solid state lasers, unless specified for 325 nm and air-cooled. The LASERS should be extremely stable for the long time Raman experiments (at least 48 hours continuously).

All LASERS should be linearly polarized, single mode, TEM00, long coherence length ($> 20\text{ m}$). Vendors also provide the information and data sheet about sensitivity (signal to noise ratio) for each LASER.

- a) Excitation LASER 325 nm (25 mW or more),
- b) Excitation LASER 532 nm (100 mW or more),
- c) Excitation LASER 633 nm (15mW or more),
- d) (Optional) Excitation LASER 785 nm (100 mW or more),

- I. Lasers switching preferably software controlled.
- II. Laser Power Control: The spectrometer should be fitted with a filter wheel with 9 neutral density filters (100%,50%,25%,10%,5%,3%,1%,0.1%,0.01%.) controlled by software to control the LASER power on the sample.
- III. All necessary filters compatible with individual Laser sources and necessary for recording Raman and Photoluminescence spectra should be provided..
- IV. Laser Polarization modulator: Zero-order half-waveplate and zero-order quarter-waveplate for all the Lasers with precision rotation mount should be provided.
- V. Digital laser power meter: The power meter should be capable to measure LASER power (in the range 10 pW to 1W), with accessories to measure laser power. Power meter should have accuracy of 0.15 % (or less).

VI. Safety equipments and protective eye-glasses for LASERS (5 numbers)**C. Confocal Microscope with high stability coupled to the spectrometer for spectroscopy and imaging:**

- I. Microscope should be branded research grade microscope (for instance Olympus/Nikon/Zeiss/Leica or specify) with USB-PC controlled high resolution colour TV camera for viewing samples under white light and laser illumination including video card for digitizing the image of sample, using programmed software. The vendor should clearly specify the geometry, model and make of the microscope.
- II. An internal white light illuminator by transmission supplied with an Abbe condenser.
- III. Objectives: Infinity corrected objectives suitable for Raman and PL Measurements
 - a. Normal function: Magnification 5X, 20X, 50X (NA~ 0.75), 100X (NA~0.9),
 - b. Long working distance (LWD) objectives 20 X (WD ~12mm) 50X (WD ~10 mm or more) & 100X (WD~3 mm). Long working 50X objective should be compatible with heating stage (described below) to perform low temperature micro Raman measurements.
 - c. Objectives for UV range: Include the suitable objectives for WD~1 mm and WD ~10 mm working distance objective for UV 325 nm laser line

NOTE: The vendor should specify details of the available objectives such as magnification and working distance, if not listed above.

III. Microscope should have back scattering geometry for spectrum collection.

IV. The microscope should have provision for large free space under the objective turret to accommodate large sample holders like cryostat, high temperature and high pressure cells.

V. Fully automated switching between video and Raman mode

D. Confocal Raman Imaging

XYZ motorized stage with 100nm (or better) step size in XY & 16nm (or better) in Z

direction. A detachable sample holder XYZ Mapping Stage with manual (with Joy Stick) as well as computer-controlled, XY-Z movements,

- I. Resolution ~ 100 nm or lower/better
- II. Scan Range: several 100 μm to mm (short range) or several cm (long range).
- III. Capability of scanning area of 30 μm x 30 μm with 50X objective,
- IV. The vendor should mention the step sizes of the stage and spatial resolutions (for different required lasers with 50 X objectives) in technical document.

E. A multichannel Charge coupled device (CCD) detector:

High efficiency thermoelectrically cooled CCD: A fully automated multichannel detectors suitable for both Raman and PL measurements with active pixels 1024 X 256 pixels (or more) and pixel size of 26 μm X 26 μm (or better).

- I. The spectral range: 200 nm (or lower) to 1000 nm (or higher), [Specify details of the detectors if numbers not matching with requirements]
- II. Very low noise levels and dark noise less than 0.002 e/pixel/sec or better,
- III. Quantum efficiency must be 30 % or more (in the required spectral range),
- IV. Computer interface and software controlled: USB and/or RS-232/IEEE-488

F. Computer and software:

- I. The state-of-the-art computer control system compatible-with and optimized for the application software to perform the various measurement options automatically. The desktop computer with the latest Processor, 8 GB RAM, 1 TB Hard drive, DVD RW, 23 inches color LED monitor, wireless key board and mouse with preinstalled software would be preferable.
- II. The data acquisition and analysis software should be compatible with latest version of computer environment. Enough number of software licenses should be supplied to be used with more than two computers (one as main and one standby) for control of the instrument, data acquisition and data analysis for Raman, photoluminescence and Raman mapping with storage options. The software should have automatic spectral intensity corrections. The data file should be compatible for plotting in different data plotting and analyzing software.
- III. The vendor should provide more than 5 number of the latest software licenses for data/spectrum analysis.
- IV. A latest library of Raman spectra for inorganic and organics materials should be provided.

G. Heating options:

The technical offer should include liquid nitrogen based cooling / heating stage for the temperature range of 77 K-800 K and having following specifications:

- (i) Cooling / Heating option: Should be able to perform Raman and Photoluminescence measurements in the range of 77 K to 800 K (or more). The temperature controlled stage should be equipped at least 4-probes for simultaneous electrical transport measurements.
- (ii) (Temperature controller for cryostat and other required accessories for low temperature micro-Raman and Photoluminescence measurements. The temperature control and stability should be of ~10 mK at 300 K.
- (iii) Should be able to mount on the microscope XYZ stage for spectroscopy and imaging.
- (iv) Calibrated sensors for temperature measurements.
- (v) Optical windows should be suitable for Raman and Photoluminescence measurements (i.e. no change in light polarization and should not have Raman modes or photoluminescence of its own in the required spectral range) in the wavelength range of 325 nm to 1000nm and with transmission more than 90%.
- (vi) The sample space should be radiation shielded with oxygen free highly conducting copper and nickel plated.
- (vii) The cooling / heating stage should be fully automated for specified Raman and Photoluminescence measurements.

H. Other Requirements: The vendor should provide declaration certificates for following

- I. Vendor should provide the standard samples for testing and calibrating the instruments at any time for the demonstration of the performance of equipment.
- II. Manuals (both electronic and hard copy) – technical aspects with required service details
- III. Installation – The satisfactory installation to the full specifications of the machine with all accessories at IIT Palakkad campus. Any additional equipment/accessory for the installation of the system should be quoted invariably. IIT Palakkad will provide only space and electrical connection.
- IV. Training – Free training to IIT Palakkad operators and students/staffs to the satisfaction of IIT Palakkad.
- V. The complete system should be compatible to 220-230 VAC 50Hz, single phase power supply. The vendor should specify the power requirements for all the components in the technical quotation.
- VI. Vendor should provide the tools and Spare part for smooth functioning of the machine for 3-5 years.
- VII. Set of Mirrors, Opto-mechanics accessories and tools made of stainless steel for macro Raman measurements.

I. Optional: The vendor should quote separately for following optional items providing the complete technical details of the listed items.

II. Excitation LASERs of wavelength

- i. 457 nm (20 mW or more)
- ii. 355 nm (10 mW or more)
- iii. 785 nm (100 mW or more)

I2. List of the optional accessories (relevant gratings, filters and other optics) for various options required for the machine should also be mentioned separately if not listed above.

J. Guarantee / Warranty and after sales technical support: The tender must be quoted with three years on-site comprehensive Warranty / Guarantee commencing after completion of one year standard warranty (FOC) against the defect of any manufacturing, workmanship and poor quality of the components. The bidder also must agree and issue a certificate stating that technical query will be responded within 3 working days and the support will be provided within 7 working days from the date of reporting of the technical failure for down time free operation of the instrument.

Who can participate in the bid?

Only those bidders fulfilling the following criteria should respond to the tender.

1. The bidder should be either an Original Equipment Manufacturer (OEM) of Low- and High-Temperature Raman spectroscopy, Raman Imaging and Photoluminescence measurements equipment with accessories or should be an authorized representative (provide documentary proof) of an OEM.
2. The bidder should be a company registered under the Companies Act, 1956/2013 OR a Limited Liability Partnership /a registered partnership firm OR a sole-proprietorship entity. Appropriate Registration incorporation certificate must be submitted.
3. The bidder must have a registered office in Karnataka/Tamil Nadu/Telangana/Andhra Pradesh/Maharashtra or Kerala. Certificate of registration for the offices to be provided.
4. The bidder must also have a service center in Karnataka/Tamil Nadu/ Telangana/Andhra Pradesh or Kerala. Certificate of registration for the centers to be provided. Details about scope of service activities provided by the service centres must be provided. The contact details of the service engineers must be provided.
5. The bidder must be in existence in the business of supplying Low- and High- Temperature Raman spectroscopy, Raman Imaging and Photoluminescence measurements equipment with accessories for a minimum period of 5 previous financial years (before or since 01 April 2012). Documentary evidences of experience must be provided.
6. The bidder should have implemented orders of Low- and High- Temperature Raman spectroscopy, Raman Imaging and Photoluminescence measurements equipment with accessories worth exceeding INR 50 Lakhs during previous three financial years (01 April 2014 – 31 March 2017). Copies of the most recent purchase orders and certificates of successful implementation must be included. Copies of financial statements or evidence of turnover must be furnished.
7. The bidder should have documentary evidence of having supplied at least 1 No. of Low- and High-Temperature Raman spectroscopy, Raman Imaging and Photoluminescence measurements equipment with accessories to a Centrally Funded Technical Institution (e.g., IIT, NIT, IISc, IISER, etc.) in the recent past. The bidder must provide a certificate of satisfactory performance of the supplied equipment from the institute to which they have recently supplied. Contact details of the faculty-in-charge of the installed setup must also be provided.
8. Compliance sheet for the technical specification and OEM Brochure have to be attached along with the Technical bid. Vendor has to fill the compliance sheet and mention page number or reference number in OEM brochure. Unfilled / partially filled sheets lead to disqualification.
9. The bidder must provide detailed specification of each equipment/item. Model numbers, data sheets and brochures must be included for all equipment quoted, system and all accessories. Specifications corresponding to quoted model number must be available publicly via OEM's website for scrutiny. If not, bid can be disqualified on technical grounds.
10. Service and warranty for a minimum period of three years for the equipment must be provided. AMC for additional three years must be quoted separately.