

# INDIAN INSTITUTE OF TECHNOLOGY GOA

At Goa Engineering College Campus

Farmagudi, Ponda, Goa 403401

E-mail: purchase\_r.d@iitgoa.ac.in

GSTIN:30AABAI1653D2ZE

PAN: AABAI1653D

TAN: BLRI08261B

Enquiry No: IITGOA/R&D/2021-22/001

Date: 12/04/2021

IIT Goa invites sealed quotations in two bid form for the supply of below mentioned item.

Sl. No.	Description of Item	Qty.
1	Closed-cycle Cryogen-free Variable-temperature Microscopy-Cryostat (Detailed specifications attached as Annexure-A)	01 System.

Terms and conditions:

1. Quotation must be valid for at least 120 days.
2. The GSTIN should invariably be mentioned in your offer.
3. Kindly attach a compliance certificate along with the technical quote.
4. Prices:
  - a) The prices quoted must be on CIP Mumbai basis only.
  - b) In case of multiple options of same product, bidders are requested to quote only one best option and not multiple options.
  - c) Payment terms: 90% payment by letter of credit and balance 10% will be paid by wire transfer after satisfactory installation and commissioning.
5. Delivery and installation should be made within 22 weeks of getting a confirmed order.
6. Kindly specify the Country of Origin of goods being offered in your quotation.
7. The suppliers shall provide the banking details along with their quote on their letterhead duly signed and stamped.
8. Quotations shall be submitted in two parts;
  - 1) Part – I (Technical) should contain all the technical details and specification of the product. It should contain unpriced bid along with terms and conditions, compliance certificates, proprietary certificates (if applicable), any other certificates/details etc. This envelope should be marked as “Technical Bid”
  - 2) Part -II (Financial) The financial bid of the above item should be in a sealed envelope marked as

“Financial Bid” and should contain financial terms and conditions.

9. IIT Goa reserves the right to accept or reject any or all the bids without assigning any reason in public interest.
10. The successful bidder has to submit a Performance Guarantee Bond for 3% of the Purchase Order value and valid till one year OR up-to warranty period plus sixty days whichever is later from the date of issue of Purchase Order. Performance Guarantee Bond may be submitted within 15 (Fifteen) days from the date of order acknowledgment as a successful bidder.
11. For any clarification, you may kindly contact Dr. Santosh Kumar (E-mail: skumar@iitgoa.ac.in and R&D Stores & Purchase Cell (email: purchase\_r.d@iitgoa.ac.in) till 22/04/2021.
12. All sealed quotations must be super scribed with the tender enquiry number and should reach to the Assistant Registrar (R&D), IIT Goa, at Goa College of Engineering Campus, Farmagudi, Ponda, Goa, 403 401 by 17.00 Hrs on or before 03/05/2021.
13. Any bidder proposes to bid for the tendered item *which is from a country which shares a land border with India will be eligible to bid only if the bidder is registered with the Competent Authority. The Competent Authority for the purpose of registration shall be Registration Committee constituted by Department for Promotion of Industry and Internal Trade (DPIIT). This is also applicable for bidders bidding for finished goods procured directly/indirectly from the vendors from the countries sharing land border with India.*

**Sd/-**

**Asst. Registrar (R&D)**

## Specification

S.No.	System/Component /Operation	Description
<b>Part A: The base Microscopy Cryostat System</b>		
1		<p><b>The base system</b> of a Variable-temperature Microscopy-Cryostat <b>must include</b> the following necessary components, control units, control software, and services:</p> <ul style="list-style-type: none"> <li>a) a vacuum chamber with a cold-shield chamber; with appropriate arrangements for integrating with 30 mm and 60 mm optomechanical cage-systems centered at an optical axis of a vertically mounted microscope objective/aspheric lens in the cold-shield chamber</li> <li>b) vacuum pumps (backing (dry) and turbo) matching the volume requirement of the vacuum chamber,</li> <li>c) a cryocooler,</li> <li>d) a compressor for the cryocooler,</li> <li>e) a suitable water chiller for the compressor,</li> <li>f) a suitable size cold-plate/sample space within the cold-shield chamber; should be compatible with other types of vacuum chambers/cold-shields offered by the manufacturers; should have an integrated &amp; calibrated Cernox temperature sensor,</li> <li>g) appropriate arrangements on the cold-plate for mounting the XYZ nanopositioners stacks and the XYZ scanners stacks, with a flexibility of mounting such stacks either (i) in the center of the cold-plate and along the vertical optical axis or (ii) two of such stacks along the diameter on the cold-plate,</li> <li>h) a closed-loop XYZ nanopositioners stack with a rack-mountable controller</li> <li>i) appropriate arrangements on the cold-plate for mounting the low temperature microscope objective/aspheric lens objective vertically,</li> <li>j) a heater-cum-sample plate integrated with a calibrated temperature sensor,</li> <li>k) appropriate arrangements of mounting a heater-cum-sample plate on top of the nanopositioners plus scanners stacks,</li> <li>l) suitable PCB based sample holder with minimum 10 electrical contacts with a possibility of electrical insulation from the positioning/scanning stages,</li> <li>m) a thermal link between the cold-plate and the sample-plate for efficient cooling/heating of the sample,</li> <li>n) a thermal link between the cold-plate and the microscope objective/aspheric lens objective for cooling and maintaining the temperature,</li> <li>o) Fused-silica optical windows from sides and top; both on a vacuum chamber and on a cold-shield chamber; Thicknesses of each windows must be specified; Top-windows must have Anti-reflection coating in the range of 400 – 1000 nm.</li> <li>p) a high NA <math>\geq 0.65</math> Aspheric lens objective for measuring the devices where a relatively longer vertical clearance is required,</li> <li>q) an optical table with 4 No. of pneumatic vibration isolator legs and with an air compressor for its automatic levelling,</li> <li>r) control units (temperature, position, etc.) to control various components of the cryostat,</li> <li>s) break-out panels (twisted pair wiring) interfacing between the cryostat hardware and the various electrical connectors (BNCs/coaxial connectors for low-current measurements/other components specific connectors)</li> <li>t) control software and libraries to interface with various control units of the cryostat and with various programming platforms like Python, C++, Labview, etc.,</li> <li>u) a hand-held touch-screen device for controlling/monitoring hardware of the cryostat without disturbing the optical table,</li> </ul> <p>The detailed specifications of above components, control units, and control software are detailed below:</p>
2		Manufacturer/bidder must declare that they can provide a high NA $\geq 0.80$ Apochromat low-

	temperature microscope-objective (for performing a high collection-efficiency measurement) at an additional cost and at a later stage. This objective must match following specifications: a) Apochromat range $\leq 710$ to $\geq 970$ nm b) Numerical Aperture NA $\geq 0.80$ c) Working Distance WD $\geq 0.6$ mm d) Anti-Reflection coating ( $> 80\%$ transmission) $\leq 450$ nm to $\geq 970$ nm e) Clear aperture on top of the microscope objective $\geq 4.5$ mm	
3	Cryostat should be fully cryogen-free, i.e., no requirement of liquid Helium and/or liquid Nitrogen at any point of time.	
4	The cryostat pumping kit, cryocooler and vacuum chamber must be fully integrated into a research-grade optical table.	
5	No parts of the cryostat except for the sample space, vacuum chamber and related mounts should be mounted on the optical table. This would ensure maximum working space on the optical table.	
6	Computer-controlled operations of: a) vacuum pumping of the cryostat chamber, auto-start of turbo vacuum-pump once backing vacuum-pump reached to the required minimum vacuum level b) cooling-down and warming-up of the cryostat, and c) temperature of the heater-cum-sample plate mounted in the cryostat d) XYZ motions of the sample plate All above operations should be performed using a remotely controlled hand-held touch-screen device. Software for computer/remote control should be provided along with libraries for integration with Python, C++, Labview, etc.	
7	Compressor	The system should include a water-cooled compressor to avoid temperature fluctuations in the laboratory. The compressor must meet following specifications: Single phase, 230/240V, 50Hz, $\geq 2.6$ kW@50Hz, $\geq 2.5$ L/min cooling water. The length of the flexlines, connecting the compressor with the cold-head of the cryocooler, cannot be predicted at this moment. Thus, manufacturer/bidder must advise us on lengths (also on limits) of these flexlines, on any additional pricing on longer flexlines.
8	Water chiller	A suitable water chiller matching the water-temperature, water-pressure, water-flow rate requirements of the compressor should be provided.
9	Optical table, legs, and its air compressor	A research-grade optical table with two tuned dampers and with following specifications should be provided: a) size: 1200 mm X 3000 mm b) thickness: $\geq 300$ mm c) mounting holes: Metric, M6 d) mounting hole pattern: Metric, 25 mm grid e) mounting holes border: Metric, 12.5 mm f) 4 No. pneumatic vibration isolators legs of height $>590$ mm and with automatic releveing mechanism g) an air compressor with max air pressure not less than 110 psi, with a noise level not more than 40 dB at 1 m, and working on a single phase 230/240 VAC, 50 Hz mains supply

10	Spacing and mounting provisions in the vacuum chamber/cold shield/cold-plate	<p>Suitable size vacuum-chamber and a cold-shield for enclosing a sample space/cold-plate of diameter not less than 70 mm should be provided to host:</p> <ol style="list-style-type: none"> <li>a low temperature compatible microscope objective mounted vertically</li> <li>an aspheric lens objective (if microscope objective is not used) mounted vertically</li> <li>nanopositioners and scanners stages mounted on the cold-plate for holding and movement of sample/device.</li> </ol> <p>Vacuum chamber should have enough space for mounting the nanopositioners stacks, scanners stack, and including all necessary mounting parts for thermal connections between a cold plate and sample plate (objective) to thermalize the sample plate (objective) to 4K.</p>
11	Positioning/scanning hardware in the vacuum chamber/cold shield, break-out interface, and controller	<ol style="list-style-type: none"> <li>The vacuum chamber/cold-shield/cold-plate should host a stack of XYZ-closed-loop nanopositioners.</li> <li>All nanopositioners should have integrated resistive encoder for reading the positions to be used in the feedback circuit of the controller.</li> <li>The nanopositioners position resolutions should be 200 nm or less, and unidirectional-position-repeatability should be 2 micrometer or less</li> <li>Each nanopositioners should be stackable with a heater-cum-sample plate, with each-other, and with a scanner set ANSxyz100 from Attocube Germany (already available at IIT Goa).</li> <li>All necessary connectors required for operating the nanopositioners and their controllers should be made on the break-out panel.</li> <li>The controller should have necessary electronics for controlling up to 3 nanopositioners in closed-loop control (Resistive encoders) with 3 nanopositioners connection cables, including handheld remote control.</li> <li>Software for remote control of these nanopositioner and controller should be provided along with libraries for integration with Labview, Python and C++.</li> <li>The manufacturer/bidder should provide the technical details and pricing of compatible XYZ scanners and a suitable controller as optional items.</li> </ol>
12	Optical windows and Window materials and anti-reflection coating	<p>5 No. of optical windows (4 on sides and 1 on top) both on the vacuum chamber and on the cold-shield. The manufacturer/bidder must provide some standard sizes and thicknesses, and available anti-reflection coating of the windows. The diameters and thicknesses of the windows and</p>

		<p>the type of anti-reflection coating will be mentioned in the purchase order.</p> <p>Windows should be made of Fused-silica.</p> <p>The heights of the centers of the side windows must match the height of the top of the heater-cum-sample plate.</p> <p>The top window must be centered on the axis of the vertically microscope objective/aspheric lens objective.</p> <p>All windows should be mounted at small angles to avoid back reflections of excitation laser and collection signal on the same paths.</p> <p>Transmitted Wavefront Distortion <math>&lt; \lambda/10</math>.</p> <p>Surface Quality: 20/10 (Scratch/Dig).</p>
13	Thermal links/coupling devices	<p>A thermal link/coupling device integrated with a Cernox temperature sensor and with a heater must be provided to control the temperature of the sample-plate/sample in the range of minimum achievable temperature 4K to 325K.</p> <p>The sensor's specifications and the calibration file should be provided for a temperature range wider than the control range of 4 k – 300 K. The sensor should be made of non-magnetic materials.</p> <p>A thermal link/anchoring of a sample-plate to cold-plate/finger, compatible with positioners and scanners should be provided, which should be made from gold plated copper.</p>
14	Temperature Control	<p>It should cover a temperature range of 4 K to 300 K.</p> <p>It should have temperature stability of <math>&lt;20\text{mK}</math> (peak-to-peak).</p> <p>It should have a cooling power <math>&gt;140\text{mW}</math> at 5 K.</p>
15	Vibrational Stability of the cold-plate	<p>It should have a vibration stability of <math>&lt;5\text{ nm}</math> (peak-to-peak, 1500 Hz bandwidth).</p>
16	Vacuum chamber/sample space	<p>Enough to accommodate to low temp XYZ positioners, XYZ scanners, thermal links, the sample stage/PCB based sample stage, low temperature microscope objective/aspheric lens objective.</p>
17	Sample environment	<p>Sample should be in a cryogenic vacuum space. The base pressure in the sample chamber should be <math>&lt;5\text{e-6 mbar}</math> and leak rate should be <math>&lt;5\text{e-9 mbar l/s}</math></p>
18	Vacuum pumping	<p>The vacuum chamber/cold-shield chamber must be pumped using a two-stage (backing (dry) and turbo) non-cryogenic vacuum pumping method to a pressure <math>&lt;1\text{e-3 mbar}</math> before the cool-down. A user should have a control to set this pressure.</p>
19	Dry vacuum pumping	<p>Oil-free vacuum pumps with an appropriate vacuum gauge covering a range wider than the base pressure should be provided.</p>
20	Break-out panels/electrical wiring for nanopositioners, scanners, heater-cum-sample plate, low-current measurement and PCB based device mount	<p>Fixed, thermalized plugs at 4K, not less than 30 electrical contacts, no clamping of wires, all wires with less than 3 Ohm resistance. Break-out panels (twisted pair wiring) interfacing between the cryostat hardware and the various electrical connectors (BNCs/coaxial connectors for low-current measurements/other components specific connectors)</p>

21	Sample exchange	Easy access for sample exchange via removal of vacuum chamber/cold-shield
22	Aspheric lens objective	Aspheric lens objective should be mounted vertically, and it should have following specifications: a) Numerical aperture NA $\geq 0.65$ b) Working distance WD $\geq 1.5$ mm c) AR coating ( $> 80\%$ transmission) $\leq 450$ to $\geq 970$ nm d) Maximum diameter 12 mm
23	There should not be any glass window/shield between the sample/device mount and the objective.	
24	Depending on a height of the sample, there should be provision to FIX an objective at a certain height so that FOCUS of the collection/excitation can be achieved using a Z-axis nanopositioner and/or a Z-axis scanner.	
25	A feedthrough ring should be supplied with the base system and it should have a provision of enough No. of blind flanges for onsite upgradations with the DC wiring/high-frequency co-axial SMA wiring/fiber patch cables integrations.	
26	On site installation of the microscopy cryostat (both the optical table and the cryostat) of the system.	
27	IIT Goa is currently located at its temporary campus, and we are expecting to move to our permanent campus in 2-3 years or so. Thus, the manufacturer/bidder must have to agree to re-install the complete system on the permanent campus on payment of an additional cost. The manufacturer/bidder must provide a projected cost of this re-installation.	
28	The manufacturer/bidder must ship all parts, preferably in a single shipping via flights on CIP Mumbai basis. In any case, a delivery period should not exceed a period of 22 weeks.	
29	The manufacturer/bidder must provide at least ONE year warranty period for the complete cryostat system.	
30	The bidder must provide a quote for a non-comprehensive annual maintenance contract (AMC) of the complete system. This contract would start upon expiry of the warranty period.	
31	The manufacturer/bidder may explore the local market to supply some compatible items like a chiller.	
<b>Part B: Optional items</b>		
The manufacturer/bidder must provide:		
31	The technical details and pricing of compatible XYZ scanners, a suitable baser controller, compatible modules. Such a controller and available modules should also be compatible with various rotation stages offered by the OEM.	
32	The pricing of a low-temperature Apochromat microscope-objective, which may be purchased at a later stage.	
33	An upgradation pricing for increasing the size of the optical table to 1500 mm X 3000 mm.	
34	An upgradation pricing of a feedthrough ring with 2 No. of high-frequency co-axial SMA (Female) connectors, with 2 No. FC/APC connectors (suitable for fibers to work in the NIR range).	
35	The technical details and pricing of a suitable vacuum chamber/cold-shield, with 4 optical	

	windows on sides and 1 optical window on top for investigating the samples/devices using 5 room temperature microscope objectives. The chamber must be compatible with the existing cryocooler and the sample plate.
36	A pricing of an AR coated (400 -1000 nm) windows should be quoted for upgrading the side windows of the cryostat.

## UNDERTAKING FOR BID SECURITY

(To be issued by the bidder on company's letterhead in lieu of EMD)

To,  
The Registrar,  
Indian Institute of Technology Goa,  
At GEC Campus, Farmagudi, Ponda – Goa

We, M/s ..... (name of the firm), with ref. to enquiry no.

..... dtd ..... hereby undertake that:

- 1) We accept all the terms and conditions of the tender document.
- 2) We accept that, we will not modify our bid during the bid validity period, submit performance guarantee within the stipulated period and honor the contract after award of contract.
- 3) In the event of any modification to our bid by us or failure on our part to honor the contract after final award or failure to submit performance guarantee, our firm may be debarred from participation in any tender/contract notified by Indian Institute of Technology, Goa for a period of one year.

Yours faithfully,

(Signature of the bidder with date and seal)

## UNDERTAKING FOR COUNTRY OF ORIGIN

(To be issued by the bidder on company's letterhead in)

To,  
The Registrar,  
Indian Institute of Technology Goa,  
At GEC Campus, Farmagudi, Ponda – Goa

We, M/s ..... (name of the firm), with ref. to enquiry no..... are bidding for tendered item (***strike which is not applicable***)

1. which is from a country which shares a land border with India (***enclosed DPIIT registration certificate***)
2. which is from a country which does not shares a land border with India

(Signature of the bidder with date and seal)

**PRICE BID FORMAT**

(To be printed on letterhead of the bidder)

S.No.	Item description	Qty.	Rate	Currency	Total
A	Closed-cycle Cryogen-free Variable-temperature Microscopy-Cryostat (Detailed specifications attached as Annexure-A)				
B	GST _____ % of (A) HSN Code/ SAC Code _____				
Grand Total(A+B)					

Amount in Words \_\_\_\_\_

only.

#HSN Code: "Harmonized System of Nomenclature Code No." and SAC Code: "Service Accounting Codes Code No."

Signature.....

Name .....

Place:

Company Name &amp; Address: .....

Date:

Affix Rubber Stamp: .....

**Note: Price Bid should be submitted in given format only. For additional information items above format may be typed and used.**

## REASONABILITY OF PRICES

Please quote best minimum prices applicable for a premier Educational and Research Institution. The party must give details of at least two purchase orders identical or similar equipment, supplied to any IITS/Research Institutions/ other organisation as per below Format (to be enclosed in Financial Bid) along with the final price paid and details are mandatory.

### Previous Supply Orders

Name of the Firm \_\_\_\_\_

S.No.	PO No. & Date	Description & Quantity of ordered equipment	Value of Order	Date of completion of delivery as per contract	Remarks indicating reasons for late delivery, if any and justification of price difference of their supply order & those quoted to us	Has the equipment being installed satisfactorily (attach a certificate from the Purchaser/ Consigner)	Contact Person along with Telephone no., Fax No. and e-mail address

Place: \_\_\_\_\_

Date: \_\_\_\_\_

Signature and Seal of the Manufacturer / Bidder

**(To be printed on letterhead of the bidder)**

**Bidders Information**

<b>1</b>	Name of the Bidder	
<b>2</b>	Address of the Bidder	
<b>3</b>	PAN No. ( <i>Enclosed copy</i> )	
<b>4</b>	GST No. ( <i>Enclosed copy</i> )	
<b>5</b>	E-mail	
<b>6</b>	Contact Person's Name & Designation	
<b>7</b>	Mobile No	

**Indian Agent's Information**

<b>1</b>	Name of Indian Agent	
<b>2</b>	Address of Indian Agent	
<b>3</b>	Indian Agent PAN No. (enclosed copy)	
<b>4</b>	State of GST Registration (enclosed copy)	
<b>5</b>	E-mail	
<b>6</b>	Contact Person's Name & Designation	
<b>7</b>	Mobile No	

FORMAT FOR PERFORMANCE GUARANTEE BOND

(To be typed on Non-judicial stamp paper of the value of Indian Rupees of One Hundred) (TO BE ESTABLISHED THROUGH ANY OF THE NATIONAL BANKS (WHETHER SITUATED AT GOA OR OUTSTATION) WITH A CLAUSE TO ENFORCE THE SAME ON THEIR LOCAL BRANCH AT GOA OR ANY SCHEDULED BANK SITUATED AT GOA. BONDS ISSUED BY CO-OPERATIVE BANKS ARE NOT ACCEPTED.

To,
The Registrar,
Indian Institute of Technology, Goa
Farmagudi, Ponda,
Goa – 403401

LETTER OF GUARANTEE

WHEREAS Indian Institute of Technology, Goa (Buyer) have invited Tenders vide Tender No..... Dt. .... for purchase of .....

AND

WHEREAS the said tender document requires that any eligible successful tenderer (seller) wishing to supply the equipment / machinery, etc. in response thereto shall establish an irrevocable Performance Guarantee Bond in favour of "Registrar, Indian Institute of Technology, Goa" in the form of Bank Guarantee for Rs ..... (3% (three percent) of the purchase value) and valid till one year or upto warranty period whichever is later from the date of issue of Performance Guarantee Bond may be submitted within 15 (Fifteen) days from the date of Order Acknowledgment as a successful bidder.

NOW THIS BANK HEREBY GUARANTEES that in the event of the said tenderer (seller) failing to abide by any of the conditions referred in tender document / purchase order / performance of the equipment / machinery, etc. this Bank shall pay to Indian Institute of Technology, Goa on demand and without protest or demur Rs..... (Rupees.....).

This Bank further agrees that the decision of Indian Institute of Technology, Goa (Buyer) as to whether the said Tenderer (Seller) has committed a breach of any of the conditions referred in tender document / purchase order shall be final and binding.

We, ..... (name of the Bank & branch) hereby further agree that the Guarantee herein contained shall not be affected by any change in the constitution of the Tenderer (Seller) and/ or Indian Institute of Technology, Goa (Buyer).

Notwithstanding anything contained herein:

- 1. Our liability under this Bank Guarantee shall not exceed Rs. .... (Indian Rupees ..... only).
2. This Bank Guarantee shall be valid up to .....(date) and
3. We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if IIT Goa serve upon us a written claim or demand on or before ..... (date).
4. This Bank further agrees that the claims if any, against this Bank Guarantee shall be enforceable at our branch office at ..... situated at ..... (Address of local branch).

Date:

Yours truly,
Signature and seal of the Guarantor:
Name of Bank:

Instruction to Bank: Bank should note that on expiry of Bond Period, the Original Bond will not be returned to the Bank. Bank is requested to take appropriate necessary action on or after expiry of bond period.