

Institute of Nano Science and Technology
Knowledge City, Sector 81, Mohali -140306, Punjab, India
Ph: +91-172-2297000; E-mail ID: purchase@inst.ac.in

F. No. INST/12(350)/2021-Pur

Date: 08.03.2022

To

NOTICE INVITING E-TENDER

Online tenders are invited on behalf of the Director, INST Mohali in TWO BID SYSTEM for the Supply and installation of “**Molecular Beam epitaxy with in-situ RHEED and UHV preparation chamber**” as per technical specification and details given below and BOQ list from the original manufacturer/supplier at CPPP i. e. <https://eprocure.gov.in/eprocure/app>. Tender documents may please be downloaded from the E-procurement portal website <https://eprocure.gov.in/eprocure/app> & Institute website www.inst.ac.in.

Sd/-

Chief Finance and Administrative Officer

NOTE: This is a domestic Tender according to the DPIIT Order dated 15/07/2017 and subsequent amendments to the order for Public Procurement Preference & PROVISION FOR LOCAL SUPPLIERS TOWARDS PREFERENCE TO MAKE IN INDIA. The bidder required to declare on the letter head the percentage of Local content for the quoted instrument and submit with the Technical Bid. Bidder should also give details of the location(s) at which the local value addition is made.

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E-TENDER

NOTICE INVITING E-TENDER

INST invites tender from the reputed manufacturers or their authorized dealers so as to reach this office on or before scheduled date and time for the instrument, as per specifications given in the Annexure attached to the Tender form. All offers should be made in English and should be written in both figures and words. Tender forms can be downloaded from the website (www.inst.ac.in) of the Institute.

The bidders are requested to read the tender document carefully and ensure compliance with all specifications/instructions herein. Non-compliance with specifications/instructions in this document may disqualify the bidders from the tender exercise. The Director, INST reserves the right to select the item (in single or multiple units) or to reject any quotation wholly or partly without assigning any reason. Incomplete tenders, amendments and additions to tender after opening or late tenders are liable to be ignored and rejected.

EQUIPMENT DETAILS

S. No.	Ref. No.	Item Description	Qty	Tender Fee (Non refundable)	EMD
1	INST/12(350)/2021-Pur	Molecular Beam epitaxy with in-situ RHEED and UHV preparation chamber	01 No.	Rs. 590/-	Rs. 11,75,000/-

IMPORTANT NOTE, DATES & TIME

Tender Publishing Date and time	9 th March, 2022 (1200HRS)
Tender Document download start Date & Time	9 th March, 2022 (1300HRS)
Date and Time of Pre-bid Meeting	17 th March, 2022 (1100HRS)
Last Date & Time For Submission	29 th March, 2022 (1400HRS)
Date / Time of Opening of Bids	30 th March, 2022 (1500 HRS)
Venue of Bid Opening at INST	INST, Knowledge City, Sector 81, Mohali

Pre-Bid Meeting (PBM)

- The objective of PBM is to provide a platform for clarifying issues and clearing doubts, if any, about the specifications and other allied technical/commercial details of the bid document. Bidders are requested to submit their bids only after the PBM so as to take care of the changes made in the bidding document, if any.
- The prospective participants should inform their intention to participate and send written queries at the email: purchase@inst.ac.in positively up to 15th March, 2022 to enable us to keep the response ready. Queries after 15th March, 2022 upto 4.00PM will not be entertained.
- Change in the technical specifications and terms & conditions if any, for the above item after pre-bid deliberations, will be uploaded on the INST website & CPPP Website. All vendors are requested to quote accordingly.

IMPORTANT NOTE:

- **PLEASE STRICTLY ADHERE TO THE DATES / TIMES MENTIONED IN TENDER DOCUMENT**
- Only online tenders through E-procurement portal website <https://eprocure.gov.in/eprocure/app> should be accepted and not through physically.

The Director, INST reserves the right to accept/reject any offer in part or full without assigning any reason.

Instructions to bidders for submission of Bids

- I. The e-tenders are being invited for Supply and installation of “**Molecular Beam epitaxy with in-situ RHEED and UHV preparation chamber**” through e-procurement. All the instructions of e-procurement is applicable. Tender must be submitted through e-procurement website only. The bid received in physical mode shall not be considered at all. Detailed information regarding the items, application / tender forms, EMD details, specifications, terms and conditions can be downloaded from the following websites www.inst.ac.in or <https://eprocure.gov.in/eprocure/app>
- II. The interested bidders shall submit their tender(s) both Technical bid and financial bid through online mode in <https://eprocure.gov.in/eprocure/app>. The bidders shall upload all the documents as per NIT for Bidders.
- III. Any corrigendum to this tender will be notified through the aforesaid websites only. INST reserves the right to accept or reject any or all the bids without assigning any reason at any stage.
- IV. The Bidder is expected to examine all instructions, eligibility criteria/pre-qualification criteria, forms, terms and conditions in the tender document. Failure to furnish complete information as required with reference to the tender document shall result in rejection of the bid.
- V. Bidders have to submit a valid EMD declaration (Annexure) in the Technical bid in place of EMD. Bids received without EMD declaration will not be considered and summarily rejected.
- VI. Any attempt to negotiate directly or indirectly on the part of the Bidder with authority competent to finally accept the Tender or influence the acceptance of the tender by any means will result his tender excluded from consideration.
- VII. Conditional tender, illegible and ambiguous tender, partially filled tender, incomplete tender and tender without enclosing required documents will be summarily rejected.
- VIII. This office reserves the right to accept or reject any bid without assigning any reason at any time prior to award of contract, without thereby incurring any liability to the affected bidder or bidders or any obligations to inform the affected bidder or bidders of the grounds for this Office’s action.
- IX. Tenderers are requested that, before quoting their rates or filling tender, the tender form may please be read out thoroughly (line by line), otherwise the Competent Authority of this office will not be held responsible for any error/oversight of his own.
- X. Clarification regarding any ambiguity in eligibility criteria may be sought through e-mail at purchase@inst.ac.in.

- XI. Concessional GST is applicable for all the items purchased for Research labs vide Ministry of Finance, notification no. 45/22017 dated 14.11.2017 and 47/2017 dated 14.11.2017.
- XII. Bidder/s quoting in currency other than Indian Rupee (INR) should explicitly mention the currency in which tender quoted wherever applicable in Technical Bid along the tender documents.
- XIII. The online Price BOQ is in INR format. If bidder want to quote other than INR please specify the quoted currency in the technical bid/part and fill the amount in same BOQ.
- XIV. Please bifurcate the price on shipping terms i, e, Ex-works -> FCA/FOB -> CIP/CIF in price BOQ and specify the same in technical bid without price.
- XV. THE INSTITUTE IS EXEMPTED FROM EXCISE AND CUSTOM DUTY under notification no- TU/V/RG-CDE (119 4)/2018 DT.07/09/2018.

REGISTRATION

- 1) Bidders are required to enroll on the e-Procurement module of the Central Public Procurement Portal (URL:<http://eprocure.gov.in/eprocure/app>) by clicking on the link "Click here to Enroll". Enrolment on the CPP Portal is free of charge.
- 2) As part of the enrolment process, the bidders will be required to choose a unique username and assign a password for their accounts.
- 3) Bidders are advised to register their valid email address and mobile numbers as part of the registration process. These would be used for any communication from the CPP Portal.
- 4) Upon enrolment, the bidders will be required to register their valid Digital Signature Certificate (Class II or Class III Certificates with signing key usage) issued by any Certifying Authority recognized by CCA India (e.g. Sify / TCS / nCode / eMudhra etc.), with their profile.
- 5) Only one valid DSC should be registered by a bidder. Please note that the bidders are responsible to ensure that they do not lend their DSCs to others which may lead to misuse.
- 6) Bidder then logs in to the site through the secured log-in by entering their userID / password and the password of the DSC / eToken.

SEARCHING FOR TENDER DOCUMENTS

- 1) There are various search options built in the CPP Portal, to facilitate bidders to search active tenders by several parameters. These parameters could include Tender ID, organization name, location, date, value, etc. There is also an option of advanced search for tenders, wherein the bidders may combine a number of search parameters such as organization name, form of contract, location, date, other keywords etc. to search for a tender published on the CPP Portal.
- 2) Once the bidders have selected the tenders they are interested in, they may download the required documents / tender schedules. These tenders can be moved to the respective „My Tenders“ folder. This would enable the CPP Portal to intimate the bidders through SMS / e-mail in case there is any corrigendum issued to the tender document.
- 3) The bidder should make a note of the unique Tender ID assigned to each tender, in case they want to obtain any clarification / help from the Helpdesk.

PREPARATION OF BIDS

- 1) Bidder should take into account any corrigendum published on the tender document before submitting their bids.
- 2) Please go through the tender advertisement and the tender document carefully to understand the documents required to be submitted as part of the bid. Please note the number of covers in which the bid documents have to be submitted, the number of documents - including the names and content

of each of the document that need to be submitted. Any deviations from these may lead to rejection of the bid.

3) Bidder, in advance, should get ready the bid documents to be submitted as indicated in the tender document / schedule and generally, they can be in PDF / XLS / RAR / DWF formats. Bid documents may be scanned with 100 dpi with black and white option.

4) To avoid the time and effort required in uploading the same set of standard documents which are required to be submitted as a part of every bid, a provision of uploading such standard documents (e.g. PAN card copy, annual reports, auditor certificates etc.) has been provided to the bidders. Bidders can use "My Space" area available to them to upload such documents. These documents may be directly submitted from the "My Space" area while submitting a bid, and need not be uploaded again and again. This will lead to a reduction in the time required for bid submission process.

SUBMISSION OF BIDS

1) Bidder should log into the site well in advance for bid submission so that he/she upload the bid in time i.e. on or before the bid submission time. Bidder will be responsible for any delay due to other issues.

2) The bidder has to digitally sign the bid document and upload the required bid documents one by one as indicated in the tender document.

3) A standard BoQ format has been provided with the tender document to be filled by all the bidders. Bidders are requested to note that they should necessarily submit their financial bids in the format provided and no other format is acceptable. Bidders are required to download the BoQ file, open it and complete the white colored (unprotected) cells with their respective financial quotes and other details (such as name of the bidder). No other cells should be changed. Once the details have been completed, the bidder should save it and submit it online, without changing the filename. If the BoQ file is found to be modified by the bidder, the bid will be rejected.

4) The server time (which is displayed on the bidders" dashboard) will be considered as the standard time for referencing the deadlines for submission of the bids by the bidders, opening of bids etc. The bidders should follow this time during bid submission.

5) All the documents being submitted by the bidders would be encrypted using PKI encryption techniques to ensure the secrecy of the data. The data entered cannot be viewed by unauthorized persons until the time of bid opening. The confidentiality of the bids is maintained using the secured Socket Layer 128 bit encryption technology. Data storage encryption of sensitive fields is done.

6) The uploaded tender documents become readable only after the tender opening by the authorized bid openers.

7) Upon the successful and timely submission of bids, the portal will give a successful bid submission message & a bid summary will be displayed with the bid no. and the date & time of submission of the bid with all other relevant details.

8) Kindly add scanned PDF of all relevant documents in a single PDF file of compliance sheet.

ASSISTANCE TO BIDDERS

1) Any queries relating to the tender document and the terms and conditions contained therein should be addressed to the Tender Inviting Authority for a tender or the relevant contact person indicated in the tender.

2) Any queries relating to the process of online bid submission or queries relating to CPP Portal in general may be directed to the 24x7 CPP Portal Helpdesk. The contact number for the helpdesk is 1800 233 7315.

General Instructions to the Bidders

- 1) The tenders will be received online through portal <http://eprocure.gov.in/eprocure/app> .In the Technical Bids, the bidders are required to upload all the documents in .pdf format.
- 2) Possession of a Valid Class II/III Digital Signature Certificate (DSC) in the form of smart card/e-token in the company's name is a prerequisite for registration and participating in the bid submission activities through <https://eprocure.gov.in/eprocure/app>. Digital Signature Certificates can be obtained from the authorized certifying agencies, details of which are available in the web site <https://eprocure.gov.in/eprocure/app> under the link "Information about DSC".
- 3) Tenderer are advised to follow the instructions provided in the „Instructions to the Tenderer the e-submission of the bids online through the Central Public Procurement Portal for e Procurement at <https://eprocure.gov.in/eprocure/app>.

TERMS AND CONDITIONS

Important Conditions of the tender to be abide by the tenderer

1. **Due date:** The tender has to be submitted before the due date. The offers received after the due date and time will not be considered.
2. **Preparation Bids:** The offer/bid should be submitted in two bid systems (i.e.) Technical bid and financial bid. The technical bid should consist of all technical details along with commercial terms and conditions. Financial bid should indicate item wise price for the items mentioned in the technical bid.
3. **Opening of the tender:** The offer/bid will be opened by a committee duly constituted for this purpose. The technical bid will be opened first and it will be examined by a technical committee which will decide the suitability as per our specification and requirement. The financial offer/bid will be opened only for the offer/bid which technically meets all our requirements as per the specification.
4. **Acceptance/Rejection of bids:** The Committee reserves the right to reject any or all offers without assigning any reason.
5. **Pre-qualification criteria:**
 - (i) Bidders should be the manufacturer / authorized dealer. Letter of Authorization from original equipment manufacturer (OEM) on the same and specific to the tender should be enclosed.
 - (ii) An undertaking from the OEM is required stating that they would facilitate the bidder on a regular basis with technology/product updates and extend support for the warranty as well.
 - (iii) OEM should be internationally reputed Branded Company.
 - (iv) Non-compliance of tender terms, non-submission of required documents, lack of clarity of the specifications, contradiction between bidder specification and supporting documents etc. may lead to rejection of the bid.
6. **Tender Fee:** Tender fee is to be obtained from the bidders except those who are registered with the Central Purchase Organisation, National Small Industries Corporation (NSIC) or the concerned Ministry or Department. The tenderer should submit Tender Fee/EMD amount as per tender ref. no. through NEFT/RTGS in INST Account. Account Details are as follows:
 - a. Name of Beneficiary: Institute of Nano Science and Technology (INST)
 - b. Account No. **2452201001102**
 - c. Name of Bank: **Canara Bank, Sector 34, Chandigarh**
 - d. IFS Code: **CNRB0002452**
 - e. MICR Code: **160015003**
 - f. Swift Code: **CNRBINBBFFC**

The details of transaction for Tender Fee viz. Name of bidder firm, Tender Description, Transaction ID/No. of Transfer, Transaction date, Amount of Transaction, Name of Bank, Address of Bank shall be furnished by the tenderer on their letterhead separately along with their tender.

7. **REASONABILITY OF PRICES :**

Please quote best minimum prices applicable for a premier Research Institution, **leaving no scope for any further negotiations on prices.** **The quoting party should give a certificate to the effect that** the quoted prices are the minimum and they have not quoted the same item on lesser rates than those being offered to INST to any other customer nor they will do so till the validity of offer or execution of the purchase order, whichever is later. We request you to fill the price reasonability certificate format in the enclosed file (Annexure "1")

The party must give details of identical or similar equipment, if any, supplied to any CSIR labs/DBT/DST Institutes during last three years along with the final price paid and Performance certificate from them.

8. **Performance Security:** The supplier shall require to submit the performance security in the form of irrevocable bank guarantee issued by any Indian Nationalized Bank for an amount which is equal to the 3% of Purchase Order value within 15 days after the final installation cum acceptance of the equipment at INST and Performance Security should be valid for a period of 60 days beyond the date of completion of warranty period of the equipment.

9. **Force Majeure:** The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, it's delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.

i) For purposes of this Clause, "Force Majeure" means an event beyond the control of the Supplier and not involving the Supplier's fault or negligence and not foreseeable. Such events may include, but are not limited to, acts of the Purchaser either in its sovereign or contractual capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.

ii) If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.

10. **Risk Purchase Clause:** In 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 the other source on the total risk of the supplier under risk purchase clause.

11. **Integrity Pact**

- a. As per the directives of the Central Vigilance Commission all government departments / organisations / institutes have to adopt an Integrity Pact (IP) to ensure transparency, equity and competitiveness in

major public procurement activities. The integrity pact envisages an agreement between the prospective bidders/vendors with the buyer committing the persons/officials of both the parties with the aim not to exercise any corrupt influence on any aspect of the contract. Only those

bidders/vendors who are willing to enter in to such an integrity pact with the purchaser would be competent to participate in the bidding.

- b. Integrity Pact also envisages Panel of Independent External Monitors (IEMs) which shall be provided/recommended by INST/its labs and institutes with the approval of by CVC.
 - c. The integrity pact would be effective from the date of invitation of bids till complete execution of the contract.
 - d. The model format of integrity pact (IP) is at Annexure - 3.
12. **Packing Instructions:** Each package will be marked on three sides with proper paint/indelible ink, the following:
- i. Item Nomenclature
 - ii. Order/Contract No.
 - iii. Country of Origin of goods
 - iv. Supplier's Name and Address
 - v. Consignee details
 - vi. Packing list reference number
13. **Delivery and Documents:**
Delivery of the goods should be made within a maximum of 12 weeks from the date of placement of purchase order and the opening of LC. Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by cable/telex/fax/e mail the full details of the shipment including contract number, railway receipt number/ AAP etc. and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company:
- i. 4 Copies of the Supplier invoice showing contract number, goods' description, quantity unit price, total amount;
 - ii. Acknowledgment of receipt of goods from the consignee(s) by the transporter;
 - iii. Insurance Certificate if applicable;
 - iv. Manufacturer's/Supplier's warranty certificate;
 - v. Inspection Certificate issued by the nominated inspection agency, if any, and the Supplier's factory inspection report; and
 - vi. Certificate of Origin.
 - vii. Two copies of the packing list identifying the contents of each package.
 - viii. The above documents should be received by the Purchaser before arrival of the Goods (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.
14. **Delayed delivery:** If the delivery is not made within the due date for any reason, the institute will have the right to impose penalty 0.5% per week and the maximum deduction is 10% of the contract value / price.
15. **Prices:** The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges. The offer/bid should be exclusive of taxes and duties, which will be paid by the purchaser as applicable. However the percentage of taxes & duties shall be clearly indicated. The price should be quoted without custom duty and excise duty, since INST is exempted from payment of Excise Duty and is eligible for concessional rate of custom duty. Necessary certificate will be issued on demand.

In case of import supply the price should be quoted on FOB Basis. Also please indicate CIF charges separately upto New Delhi indicating the mode of shipment. INST will make necessary arrangements for the clearance of imported goods at the Airport/Seaport. Hence the price should not include the above charges.

16. **Notices:** For the purpose of all notices, the following shall be the address of the Purchaser and Supplier.

i. **Purchaser:** The Director,
Institute of Nano Science and Technology,
Knowledge City, Sector – 81, Mohali – 140306.

ii. **Supplier:** (To be filled in by the supplier)

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17. **Progress of Supply:** Wherever applicable, supplier shall regularly intimate progress of supply, in writing, to the Purchaser as under:

- i. Quantity offered for inspection and date;
- ii. Quantity accepted/rejected by inspecting agency and date;
- iii. Quantity dispatched/delivered to consignees and date;

- iv. Quantity where incidental services have been satisfactorily completed with date;
- v. Quantity where rectification/repair/replacement effected/completed on receipt of any communication from consignee/Purchaser with date;
- vi. Date of completion of entire Contract including incidental services, if any; and
- vii. Date of receipt of entire payments under the Contract (In case of stage-wise inspection, details required may also be specified).

18. **Inspection and Tests:** Inspection and tests prior to shipment of Goods and at final acceptance are as follows:

- After the goods are manufactured and assembled, inspection and testing of the goods shall be carried out at the supplier's plant by the supplier, prior to shipment to check whether the goods are in conformity with the technical specifications attached to the purchase order. Manufacturer's test certificate with data sheet shall be issued to this effect and submitted along with the delivery documents. The purchaser shall be present at the supplier's premises during such inspection and testing if need is felt. The location where the inspection is required to be

conducted should be clearly indicated. The supplier shall inform the purchaser about the site preparation, if any, needed for installation of the goods at the purchaser's site at the time of submission of order acceptance.

- The acceptance test will be conducted by the Purchaser, their consultant or other such person nominated by the Purchaser at its option after the equipment is installed at purchaser's site in the presence of supplier's representatives. The acceptance will involve trouble free operation and ascertaining conformity with the ordered specifications and quality. There shall not be any additional charges for carrying out acceptance test. No malfunction, partial or complete failure of any part of the equipment is expected

to occur. The Supplier shall maintain necessary log in respect of the result of the test to establish to the entire satisfaction of the Purchaser, the successful completion of the test specified.

- In the event of the ordered item failing to pass the acceptance test, a period not exceeding one weeks will be given to rectify the defects and clear the acceptance test, failing which the Purchaser reserve the right to get the equipment replaced by the Supplier at no extra cost to the Purchaser.
- Successful conduct and conclusion of the acceptance test for the installed goods and equipments shall also be the responsibility and at the cost of the Supplier.

19. **Resolution of Disputes:** The dispute resolution mechanism to be applied pursuant shall be as follows:

- i. In case of Dispute or difference arising between the Purchaser and a domestic supplier relating to any matter arising out of or connected with this agreement, such disputes or difference shall be settled in accordance with the Indian Arbitration & Conciliation Act, 1996, the rules there under and any statutory modifications or re-enactments thereof shall apply to the arbitration proceedings. The dispute shall be referred to the Executive Director, Institute of Nano Science and Technology (INST) Mohali and if he is unable or unwilling to act, to the sole arbitration of some other person appointed by him willing to act as such Arbitrator. The award of the arbitrator so appointed shall be final, conclusive and binding on all parties to this order.
- ii. In the case of a dispute between the purchaser and a Foreign Supplier, the dispute shall be settled by arbitration in accordance with provision of sub-clause (a) above. But if this is not acceptable to the supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
- iii. supplier then the dispute shall be settled in accordance with provisions of UNCITRAL (United Nations Commission on International Trade Law) Arbitration Rules.
- iv. The venue of the arbitration shall be the place from where the order is issued.

20. **Applicable Law:** The place of jurisdiction would be Mohali (Punjab) INDIA.

24. **Right to Use Defective Goods**

If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or

use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.

25. **Supplier Integrity**

The Supplier is responsible for and obliged to conduct all contracted activities in accordance with the Contract using state of the art methods and economic principles and exercising all means available to achieve the performance specified in the contract.

26. Training

The Supplier is required to train the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.

27. Installation & Demonstration

The supplier is required to done the installation and demonstration of the equipment within one month of the arrival of materials at the INST site of installation, otherwise the penalty clause will be the same as per the supply of materials.

28. **Insurance:** For delivery of goods at the purchaser's premises, the insurance shall be obtained by the Supplier in an amount equal to 110% of the value of the goods from "warehouse to warehouse" (final destinations) on "All Risks" basis including War Risks and Strikes. The insurance shall be valid for a period

of not less than 3 months after installation and commissioning. ***In case of orders placed on FOB/FCA basis, the purchaser shall arrange Insurance.***

29. **Incidental services:** The incidental services also include:

- Furnishing of 01 set of detailed operations & maintenance manual.
- Arranging the shifting/moving of the item to their location of final installation within INST premises at the cost of Supplier through their Indian representatives.

30. **Warranty:** 1. Warranty period shall be at least three years from date of installation of Goods at the INST site of installation. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. **The warranty should be comprehensive on site.**

Note: If the OEM warranty is for 12 Months, additional extended warranty of 24 months should be quoted separately with or without price.

2. The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately within in 02 days arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the

replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. The period for correction of defects in the warranty period is 02 days.

3. If the supplier having been notified fails to remedy the defects within 02 days, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract.

31 **AMC:** Annual Maintenance Contract (AMC) up to next five years after warranty period is over, should be quoted separately.

32 **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.

32. **Governing Language**

The contract shall be written in English language. English language version of the Contract shall govern its interpretation. All correspondence and other documents pertaining to the Contract, which are exchanged by the parties, shall be written in the same language.

33. **Applicable Law**

The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction.

34. **Notices**

Any notice given by one party to the other pursuant to this contract/order shall be sent to the other party in writing or by cable, telex, FAX or e mail and confirmed in writing to the other party's address. A notice shall be effective when delivered or on the notice's effective date, whichever is later.

35. **Taxes and Duties**

Suppliers shall be entirely responsible for all taxes, duties, license fees, octroi, road permits, etc., incurred until delivery of the contracted Goods to the Purchaser. However, VAT in respect of the transaction between the Purchaser and the Supplier shall be payable extra, if so stipulated in the order.

36. **Agency Commission:** Agency commission if any will be paid to the Indian agent 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 case of Nil commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent.

37. **Payment:**

- Payment will be made through irrevocable Letter of Credit (LC). Letter of Credit (LC) will be established in the favour of foreign Supplier after the submission of performance security. The letter of credit (LC) will be established on the exchange rates as applicable on the date of establishment.
 - i. For Imports, LC will be opened for 100% FOB/CIF value. 80% of the LC amount shall be released on presentation of complete and clear shipping documents and 20% of the LC amount shall be released after the installation and demonstration of the equipment at the INST site of installation in faultless working condition for period of 60 days from the date of the satisfactory installation and subject to the production of unconditional performance bank guarantee as specified in Clause 9 of tender terms and conditions.

- ii. Indian Agency commission (IAC), if any shall be paid after satisfactory installation & commissioning of the goods at the destination at the exchange rate prevailing on the date of negotiation of LC documents, subject to DGS&D registration for restricted items.
 - iii. All the bank charges within India will be borne by the Institute and outside India will be borne by the Supplier.
- For Indigenous supplies, 80% payment shall be made by the Purchaser after delivery and balance 20% after successful installation, commissioning and acceptance of the equipment at INST in good condition and to the entire satisfaction of the Purchaser and on production of unconditional performance bank guarantee as specified in Clause 11 of tender terms and conditions.
38. **User list:** Brochure detailing technical specifications and performance, list of industrial and educational establishments where the items enquired have been supplied must be provided.
39. **Manuals and Drawings**
- Before the goods and equipments are taken over by the Purchaser, the Supplier shall supply operation and maintenance manuals. These shall be in such details as will enable the Purchaser to operate, maintain, adjust and repair all parts of the works as stated in the specifications.
 - The Manuals shall be in the ruling language (English) in such form and numbers as stated in the contract.
 - Unless and otherwise agreed, the goods equipment shall not be considered to be completed for the purposes of taking over until such manuals and drawing have been supplied to the Purchaser.
40. **Application Specialist:** The Tenderer should mention in the *Techno-Commercial bid* the availability and names of *Application Specialist* and *Service Engineers* in the nearest regional office.
41. **Terms of Delivery:** The item should be supplied to our destination in case of local supply. In case of import supply, the item should be shipped upto New Delhi Airport. The Installation/Commissioning should be completed as specified.
42. **Site Preparation:** The supplier shall inform to the Institute about the site preparation, if any, needed for the installation of equipment, immediately after the receipt of the purchase order. The supplier must provide complete details regarding space and all the other infrastructural requirements needed for the equipment, which the Institute should arrange before the arrival of the equipment to ensure its timely installation and smooth operation thereafter.

The supplier shall visit the Institute and see the site where the equipment is to be installed and may offer his advice and render assistance to the Institute in the preparation of the site and other preinstallation requirements.

43. **Installation:** The equipment or machinery has to be installed or commissioned by the successful bidder within 30 days from the date of receipt of the item at INST. In case of any mishapening/damage to equipment and supplies during the carriage of supplies from the origin of equipment to the installation site, the supplier has to replace it with new equipment/supplies immediately at his own risk. Supplier will settle his claim with the insurance company as per his convenience. INST will not be liable to any type of losses in any form.
44. **Spare Parts:** The Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier:
- i. Such spare parts as the Purchaser may elect to purchase from the Supplier, providing that this election shall not relieve the Supplier of any warranty obligations under the Contract; and
 - ii. In the event of termination of production of the spare parts:
 - iii. Advance notification to the Purchaser of the pending termination, in sufficient time to permit the Purchaser to procure needed requirements; and
 - iv. Following such termination, furnishing at no cost to the Purchaser, the blueprints, drawings and specifications of the spare parts, if requested.

Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods, such as gaskets, plugs, washers, belts etc. Other spare parts and components shall be supplied as promptly as possible but in any case within six months of placement of order.

45. **Defective Equipment:** If any of the equipment supplied by the Tenderer is found to be substandard, refurbished, unmerchantable or not in accordance with the description/specification or otherwise faulty, the committee will have the right to reject the equipment or its part. The prices of such equipment shall be refunded by the Tenderer with 18% interest if such payments for such equipment have already been made. All damaged or unapproved goods shall be returned at suppliers cost and risk and the incidental expenses incurred thereon shall be recovered from the supplier. Defective part in equipment, if found before installation and/or during warranty period, shall be replaced within 45 days on receipt of the intimation from this office at the cost and risk of supplier including all other charges.

46. **Termination for Default**

The Purchaser may, without prejudice to any other remedy for breach of contract, by written notice of default sent to the Supplier, terminate the Contract in whole or part:

- i. If the Supplier fails to deliver any or all of the Goods within the period(s) specified in the order, or within any extension thereof granted by the Purchaser; or
- ii. If the Supplier fails to perform any other obligation(s) under the Contract.
- iii. If the Supplier, in the judgment of the Purchaser has engaged in corrupt or fraudulent practices in competing for or in executing the Contract. For the purpose of this Clause:

- i. “**Corrupt practice**” means the offering, giving, receiving or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution. ii. “**Fraudulent practice**” means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Borrower, and includes collusive practice among Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Borrower of the benefits of free and open competition;”

- In the event the Purchaser terminates the Contract in whole or in part, the Purchaser may procure, upon such terms and in such manner, as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Purchaser for any excess costs for such similar Goods or Services. However, the Supplier shall continue the performance of the Contract to the extent not terminated.
47. **Downtime:** During the warranty period not more than 5% downtime will be permissible. For every day exceeding permissible downtime, penalty of 1/365 of the 5% FOB value will be imposed. Downtime will be counted from the date and time of the filing of complaint within the business hours.
48. **Training of Personnel:** The supplier shall be required to undertake to provide the technical training to the personnel involved in the use of the equipment at the Institute premises, immediately after completing the installation of the equipment for a minimum period of one week at the supplier's cost.
49. **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 Mohali.
50. **Compliance certificate:** This certificate must be provided indicating conformity to the technical specifications.
51. **Acknowledgement:** It is hereby acknowledged that we have gone through all the conditions mentioned above and we agree to abide by them.

SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE COMPANY WITH DATE

BID PARTICULARS

1. Name of the Supplier :
2. Address of the Supplier :
3. Availability of demonstration of equipment : Yes / No
4. Tender cost enclosed: : Yes/No if yes
5. Online Tender Fee/EMD submission information enclosed : Yes / No if Yes
Transaction ID/No. of Transfer_____
- Transaction date: _____
- Amount of Transaction_____
- Name of Bank_____
- Address of Bank_____
6. Name and address of the Officer/contact person to whom all references shall be made regarding this tender enquiry Name:
Address:
Ph:
Fax:
Mobile:
Email:
Web:

Compliance statement for the tender specifications

Tender Ref No.: **INST/12(350)/2021-Pur**

S.No.	Check list of documents/Undertakings	Yes/No	Remarks (give explanation if the answer is No)
1.	Is EMD/Tender Fee details attached? (if applicable).		
2.	Is the bidder original equipment manufacturer (OEM)/authorised dealer?		
3.	If authorised dealer, recent dated certificate to this effect from OEM, attached or not?		
4.	Undertaking from OEM regarding technical support & extended warranty period		
5.	Validity of 180 days or not?		
6.	Price Reasonability Certificate enclosed as per format??		
7.	Undertaking from bidder regarding acceptance of tender terms & conditions		
8.	Whether list of reputed users (along with telephone numbers of contact persons) for the past three years specific to the instrument attached?		
9.	Does the instrument comply with all the specifications detailed? Attach a separate sheet showing compliance with the specifications and explanations thereto if the equipment varies from the requested specifications.		
10.	Whether free Installation, Commissioning and Application Training offered?		
11.	Whether comprehensive onsite warranty offered?		
12.	Whether Annual maintenance after expiry of comprehensive onsite warranty quoted separately?		

Annexure – 1

PRICE REASONABILITY CERTIFICATE (to be submitted in financial bid envelope)

This is to certify that we have offered the maximum possible discount to you in our Quotation No. _____ dated _____ .

We would like to certify that the quoted price are the minimum and we have not quoted the same item on lesser rates than those being offered to INST to any other customer nor we will do so till the validity of offer or execution of purchase order, whichever is later.

Seal and Signature of the tenderer

Annexure 2

Local Content Certificate (To be submitted in Technical bid envelop)

This is to certify that the % age of Local content for the quoted tendered item is_____.

Seal and signature of the tenderer

Note:

- 1. As per revised Public Procurement order 2017 D.O. No. P – 45021/2/2017-PP(BE-II) dated June 4, 2020 Local content means Amount of value added in India which shall be total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item(including all customs duties)as a proportion of the total value, in percent.**

Format of the Integrity Pact
INTEGRITY PACT

Between

Institute of Nano Science and Technology (INST) hereinafter referred to as “The Principal”.

Andherein referred to as “The Bidder / Contractor.”

Preamble

The Principal intends to award, under laid down organizational procedures, contract/s for.....The Principal values full compliance with all relevant laws of the land, rules, regulations, economic use of resources and of fairness/ transparency in its relations with its Bidder(s) and/or Contractor(s).

In order to achieve these goals, the Principal will appoint an Independent External Monitor (IEM), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

- (1) The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:
 - (a) No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.
 - (b) The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential/additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.
 - (c) The Principal will exclude from the process all known prejudiced persons.
- (2) If the Principal obtains information on the conduct of any of its employees which is a criminal offence under the IPC/PC Act, or if there be a substantive suspicion in this regard, the Principal will inform the Chief Vigilance Officer and in addition can initiate disciplinary action.

Section 2 – Commitments of the Bidder(s)/Contractor(s)

The Bidder(s)/Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

- (a) The Bidder(s)/Contractor(s) will not, directly or through any other Person or firm, offer, promise or give to any of the Principal’s employees involved in the tender process or the execution of the contract or to any third person any material or other benefit which he/she is not legally entitled to, in order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.
- (b) The Bidder(s)/Contractor(s) will not enter with other Bidders into any undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications,

Certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

(c) The Bidder(s)/Contractor(s) will not commit any offence under the relevant IPC/PC Act; further the Bidder(s)/Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically. The Bidder(s)/Contractor(s) of foreign origin shall disclose the name and address of the Agents/representatives in India, if any.

Similarly the

Bidder(s)//Contractors(s) of Indian Nationality shall furnish the name and address of the foreign principals, if any. Further details as mentioned in the "Guidelines on Indian Agents of Foreign Suppliers" shall be disclosed by the Bidder(s)/Contractor(s).

Further, as mentioned in the Guidelines all the payments made to the Indian agent/representative have to be in Indian Rupees only. Copy of the "Guidelines on Indian Agents of Foreign Suppliers" is annexed and marked as Annexure.

(e) The Bidder(s)/Contractor(s) will, when presenting his bid, disclose any and all payments he has made, is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

(2) The Bidder(s)/Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future Contracts If the Bidder(s)/Contractor(s), before award or during execution has committed a transgression through a violation of Section 2, above or in any other form such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidder(s)/Contractor(s) from the tender process or take action as per the procedure mentioned in the "Guidelines on Banning of business dealings". Copy of the "Guidelines on Banning of business dealings" is annexed and marked as Annex -"B".

Section 4 – Compensation for Damages

(1) If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

(2) If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to Section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages of the contract value or the amount equivalent to Performance Bank Guarantee.

Section 5 – Previous transgression

(1) The Bidder declares that no previous transgressions occurred in the last 3 (three) years with any other Company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

(2) If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or action can be taken as per the procedure mentioned in "Guidelines on Banning of business dealings".

Section 6 – Equal treatment of all Bidders/Contractors/Sub-contractors

- (1) The Bidder(s)/Contractor(s) undertake(s) to demand from all Subcontractors a commitment in conformity with this Integrity Pact, and to submit it to the Principal before contract signing.
- (2) The Principal will enter into agreements with identical conditions as this one with all Bidders, Contractors and Subcontractors.
- (3) The Principal will disqualify from the tender process all bidders who do not sign this Pact or violate its provisions.

Section 7 – Criminal charges against violating Bidders/Contractors/Sub contractors (1) The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

(2) The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the THE DIRECTOR, INST. The Bidder(s)/Contractor(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the Principal including that provided by the Contractor. The Contractor will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/Contractor(s)/Subcontractor(s) with confidentiality.

(4) The principal will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

(5) As soon as the Monitor notice, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or take corrective action, or to take other relevant action. The monitor can in this regard submit nonbinding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

(6) The Monitor will submit a written report to the THE DIRECTOR, INST within 30 days from the date of reference or intimation to him by the Principal and should the occasion arise, submit proposals for correcting problematic situations.

(7) Monitor shall be entitled to compensation on the same terms as being extended to/provided to Director, INST.

(8) If the Monitor has reported to the THE DIRECTOR, INST, a substantiated suspicion of an offence under relevant IPC/PC Act, and the THE DIRECTOR, INST has not, within the reasonable time taken visible action to proceed against such offence or reported it to the Chief Vigilance Officer, the Monitor may also transmit this information directly to the Central Vigilance Commissioner.

(9) The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

This Pact begins when both parties have legally signed it. It expires for the Contractor 10 months after the last payment under the contract, and for all other Bidders 6 months after the contract has been awarded.

If any claim is made/lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified above, unless it is discharged/determined by THE DIRECTOR, INST.

Section 10 – Other provisions

(1) This agreement is subject to Indian Law. Place of performance and Jurisdiction is the Registered Office of the Principal, i.e. Mohali, Punjab.

(2) Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

(3) If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

(4) Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

(For & On behalf of the Principal)
(Office Seal)

(For & On behalf of Bidder/Contractor)
(Office Seal)

Place.....

Place.....

Date.....

Date.....

Witness 1:
(Name & Address): _____

SPECIFICATION FOR “Molecular Beam epitaxy with in-situ RHEED and UHV preparation chamber”

INST invites tender bid for “Molecular Beam epitaxy (MBE) based deposition system with in-situ RHEED and UHV preparation chamber”

System Overview:

The deposition system must have two chambers. The first chamber is called *growth chamber* and the second chamber is called the *preparation chamber*. The two chambers must allow sample transfer using UHV compatible transfer arm. The growth chamber will allow for molecular beam epitaxy (MBE) based growth process involving deposition using effusion cells, and thermal cracker cells. The preparation chamber will be used to prepare samples before or after MBE growth procedures and will allow deposition of metal and metal oxide films using sputtering and e-beam evaporation methods. The preparation chamber must allow introduction of substrate into the deposition system either manually directly from air through appropriate flange or/and optionally through a load lock chamber.

1 GROWTH CHAMBER:

A. UHV stainless Steel (made of DIN 1.4406/SS 316LN or equivalent) chamber (of about 30 L volume) equipped with appropriate cryo-panel for effusion cells, thermal cracker cells and different ports for specific vacuum pumping. The growth chamber must be compatible to growth of chalcogenide materials like Te, Se, and Sb.

B. Growth chamber must be of vertical deposition geometry with substrate facing downward during film growth.

C. Appropriate arrangement of vacuum pumps should be provided to attain Base pressure $< 2 \times 10^{-10}$ mbar and $< 8 \times 10^{-11}$ (LN2 cooling). The vacuum levels must be achieved within 72 Hrs or less time post system bakeout.

D. ***Pumping System:*** The pumping system must include, turbo molecular pump (TMP), ion getter pump (IGP) with titanium sublimation pump (TSP) or other getter pumps and dry scroll pump.

(i) Turbo pump having capacity of ≥ 260 l/s with dry oil free scroll pump. Power supply and suitable cabling must be provided.

Manufacturer: Turbo Molecular Pump (TMP): Pfeiffer/Varian/Edwards or equivalent internationally reputed brands.

Dry scroll pump: Pfeiffer/Agilent/Edwards or equivalent internationally reputed brands.

Gate valve: A Pneumatically operated VAT gate valve between MBE and TMP must be provided with automatic interlock for safeguarding pump in case of vacuum failure

(ii) Ion pump (speed ≥ 300 l/s). Must have integrated cryoshroud and TSP. Power supply and suitable cabling to be provided alongwith.

Manufacturer: Pfeiffer/ Gamma/Agilent or equivalent internationally reputed brands.

Gate Valve: A Pneumatically operated VAT gate Valve between MBE and ion pump must be provided with interlock for safeguarding pump in case of vacuum failure

E. ***Pressure management:*** High sensitivity Bayard-Alpert ion gauge assembly to measure the vacuum pressure (1×10^{-3} to 1×10^{-11} Torr). Pressure gauge to measure atm to 10^{-3} mbar for pre-vacuum line. Power Supply, controllers and suitable cabling to be provided along with gauges. All the vacuum gauges and controllers must be from reputed company like Pfeiffer or Edwards or equivalent internationally reputed brands.

F. Vacuum Pump Protection:

- Appropriate cryo shroud/trap/panel must be provided for ion pump and TSP, to trap Se, Te and Sb for protecting the pumps.
- Appropriate control and safety interlocked with the UHV measurement system.

G. ***Cooling Shroud (double walled):*** The deposition chamber must have liquid nitrogen cooling shroud to isolate all effusion cells (reduce the cross-talk between high temperature cells). Cooling shroud must be around the manipulator and must be encircling all the effusion and cracker cells.

H. ***View ports:*** (i) Atleast two dedicated view port to see the inside of the chamber during transfer. The view port must have manual shutter to protected against material deposition

(ii) One Dedicated view port to see the effusion and cracker cells inside of the chamber. The view port must have manual shutter to protected against material deposition

I. Effusion and Thermal cracker cells:

(i) Number of effusion cells: 5, Number of cracker cells: 3.

(ii) The cells must be confocal arrangement in a way that the focus of deposition of all cells must coincide at the center of substrate on which deposition will be carried out.

(iii) All the cells must be separated by cell dividers made of Tantalum to reduce cross contamination. Details of cells are as follows:

(a) High Temperature effusion cells Qty: 1 Set

- Capacity: 10cc or better
- Temperature: Atleast upto 2000 C
- One Ta crucible to be provided
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables

(b) High Temperature effusion cells Qty: 1 Set

- Capacity: 10cc or better
- Temperature: Atleast upto 2000 C
- One Al₂O₃ crucible to be provided
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables

(c) High Temperature effusion cells Qty: 1 Set

- Capacity: 10cc or better
- Temperature: Atleast upto 2100 C
- One Ta crucible to be provided
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables

(d) High Temperature effusion cells Qty: 1 Set

- Capacity: 10cc or better
- Maximum Temperature: 2100 C
- One Al₂O₃ crucible to be provided
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables

(e) Low Temperature effusion cells Qty: 1 Set

- Capacity: 40 cc or better
- Maximum Temperature: 1000 C
- One Al₂O₃ crucible to be provided
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables

(f) Thermal cracker cell for Sb Qty: 1 set

- Must have separate heating stage for evaporation and cracking of evaporated molecules
- The cell must have PBN insulator to save from corrosion and to minimize cross talk bet ween heating stages
- Cracker insert should be made of PBN
- Both the heating stages (evaporation and cracking) should be separately adjustable with individual
- PBN crucible must be provided with 60 cc or better nominal volume
- Integrated pneumatically operated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables
- *Operating temperature range:*
 - Heating stage for evaporation must be atleast between 80 C to 600C
 - Heating stage for cracking must be atleast between 150 C to 800C

(g) Valved cracker cell for Te Qty: 1 set

- Must have separate heating stage for evaporation and cracking of evaporated molecules

- The cell must have PBN insulator between the heating stages to minimize cross talk between heating stages
- Cracker insert should be made of PBN
- Both the heating stages (evaporation and cracking) should be separately adjustable with individual
- PBN crucible must be provided with 60 cc or better nominal volume
- Integrated water cooling unit
- Must valve unit made of PBN with motorized integrated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables
- *Operating temperature range:*
 Heating stage for evaporation must be atleast between 80 C to 600C
 Heating stage for cracking must be atleast between 150 C to 800C

(h) Valved cracker cell for Se Qty: 1 set

- Must have separate heating stage for evaporation and cracking of evaporated molecules
- The cell must have PBN insulator between the heating stages to minimize cross talk between heating stages
- Cracker insert should be made of PBN
- Both the heating stages (evaporation and cracking) should be separately adjustable with individual
- PBN crucible must be provided with 60 cc or better nominal volume
- Integrated water cooling unit
- Must valve unit made of PBN with motorized integrated shutter
- Dedicated necessary power supply, thermocouple, pid control and cables
- *Operating temperature range:*
 Heating stage for evaporation must be atleast between 80 C to 600C
 Heating stage for cracking must be atleast between 150 C to 800C

J. Manipulator and sample plate:

- Two axis (Z-axis and Rotation axis) UHV Manipulator
- Z-axis: must allow for 0-50mm motion
- Rotation axis: motorized continuous rotation of at least 30 RPM
- Heating stage for reaching atleast upto 1200C with PID controller
- Radiation shield to protect manipulator against material coatings
- Molybdenum substrate holder (sample plate) compatible with the sample manipulator
- Appropriate sample plate style to handle sample size of upto 12 mm x 12mm (2 qty) and 10mm x 10 mm (4 qty). one blank sample plate to be provided

H. Analytical Instruments to be provided in the growth chamber:

(i) Quartz crystal microbalance

- Should be UHV beakable
- Must have shutter
- Thickness resolution: 0.01A or better
- Rate resolution: 0.01A/S or better
- Frequency resolution: 0.01Hz or better
- Linear feedthrough unit to adjust position the sensor position inside the UHV chamber
- All necessary measurement electronics, controller and cables to be supplied for reading out information into PC
- Atleast 10 qty of gold plated quartz plates to be provided
- Necessary water cooling unit to be provided

(ii) quadrapole mass analyzer/ residual gas analyzer

- Resolution 10^{-14} or better
- Must detect mass 1-200 AMU or better

- Software to control and analyze through computer
- Necessary power supply and cables to be provided
- Manufacturer should be reputed like SRS etc.

(iii) RHEED

- In-situ characterization facility with as RHEED with 15 keV energy gun. All associated electronic assembly packages, power supply and required cables should be included. Must be controllable through computer.
- Appropriate RHEED screen with manual shutter for protection against material deposition. Manufacturer: reputed brand like Staib or equivalent internationally reputed brand
- CCD camera and analysis software to be provided as option (cf option section))

I. Main Shutter: A main shutter in front of substrate to protect substrate surface from deposition during process stabilization/ flux measurement/ thickness measurements etc. The shutter must be made of tantalum.

J. other Requirements: All the effusion and cracker cells must have the individual power supply, control electronic and cables provided so as to use them simultaneously in co-deposition mode.

2. PREPARATION CHAMBER

The preparation chamber will be used to prepare the substrate by heating before introducing to the MBE chamber and deposit metal and metal - oxide layer. The deposition in the preparation chamber will be done using ebeam evaporation, DC or RF sputtering depending upon the nature of film to be prepared on top of MBE processed samples. The preparation chamber must have appropriate port that can allow direct manual introduction of samples without the requirement of a load lock and transfer arm arrangement.

A. Must be made of UHV stainless steel (DIN 1.404/SS 316L) (about 25 L volume)

B. Appropriate arrangement of vacuum pumps should be provided to attain Base pressure $< 5 \times 10^{-9}$

C. Vacuum gauges along with controller, and suitable cabling to cover the full range of vacuum operation.

D. Pumping system must include turbo molecular pump (685l/s or better pumping of N₂), dry scroll pump, any further vacuum pumps as deemed necessary to attain the base pressure. All pumps must have their power supplies and required cables for running. Pumps and gauges must be from Pfeiffer/Varian/Edwards or equivalent internationally reputed brands.

E. Must have an appropriate transfer arm for transferring sample from preparation chamber to growth chamber.

F. A VAT gate valve between preparation chamber and growth chamber

G. Must have appropriate port that can allow direct manual introduction of samples without the requirement of a load lock -transfer arm arrangement.

H. Must have a UHV Planar magnetron source 2”: Qty 1

- Target Diameter: 2”
- Must be bakeable upto 200C
- Water cooling
- Pneumatic shutter.
- Must allow for DC, RF and AC operation
- Must allow both magnetic and non-magnetic target for deposition
- Must be compatible O₂, N₂, and Ar

I. DC Power supply for magnetron source with 1000 W or better power. Cabling to be provided. Power supply must be of internationally reputed brand

J. RF Power supply for magnetron source with match box.

Power 300W, Frequency: 13.56 MHz, RS232 interface and set of suitable cables to be provided. Power supply must be of internationally reputed brand

K. Gas dosing system for sputter sources: Must have appropriate mass flow controllers, necessary leak valves and gas capillary connections and tubings compatible with O₂, N₂ and Ar

L. UHV Electron-Beam Evaporator for high purity evaporating of different kind of materials by electron-beam evaporation.

- Maximum Temperature range 2700C or better
- Must have X-Y beam deflection
- Necessary Power supply , controller and suitable cable to be provided
- Crucible size: 5cc or better
- Tantalum crucible to be provided
- Pneumatic shutter

M. Sample stage/manipulator with rotation (0-30 RPM or better) and heating upto 1000C
Necessary power supply, PID controller and cabling to be provided.

N. Quartz crystal microbalance

- Should be UHV bakeable
- Must have shutter
- Thickness resolution: 0.01A or better
- Rate resolution: 0.01A/S or better
- Frequency resolution: 0.01Hz or better
- Linear feedthrough unit to adjust position the sensor position inside the UHV chamber
- All necessary measurement electronics, controller and cables to be supplied for reading out information into PC
- Necessary water cooling unit to be provided

O. Viewport: There should be a view port to see the evaporator and sputter source and sample transfer inside of the chamber. The view port must have manual shutter to protect against material deposition.

P. Ports: Additional ports should be available for future integration of atleast two more sputter source or one sputter source and one ion source/ebeam evaporator

3. PROCESS CONTROL SYSTEM AND COMPUTER PACKAGE

- State-of-the-art PC unit must be provided
- Software control of Valve cluster and modular expandable electrical terminal to interface analog and digital signals, such as:
 - Valves and Shutters (pneumatic or electric)
 - Temperature sensors
 - Analog signals from other devices
 - Digital signals from other devices (
 - Heating lamps or similar
 - Motion (intelligent servo motors)
- Appropriate I/O computer interface via Ethernet TCP-IP where necessary must be provided
- Appropriate software for control exclusively from PC that should include
 - For system control (venting, evacuating and bake-out)
 - Incl. functions like ramping, logging and conditional sequence
 - Graphical user interface with completely interactive elements for a best view over the system

- Capable of running growth recipes and complex sequences with high time resolution through a graphical editor/ graphical user interface
- Must have appropriate Continuous data logging capabilities
- Complete control for devices with communication interface must be integrated
- Note: Implementation of further instruments via remote access must be done for free within the first two years after delivery

4. FRAME

- Made from stainless steel
- To keep all chambers and necessary accessories

5. RACK and MEDIA DISTRIBUTION

- Appropriate arrangement must be provided for mounting
 - Water cooling distribution
 - Central distribution of the different gases for the preparation chamber, pressed air etc.
 - Central distribution of the power and the thermocouple connections to the effusion cells, the manipulator heaters etc.
- Free space for further mounting of valve banks for shutter and pneumatically gate valves etc.
- Free space for further mounting of additional units, mounted to the media panel
- Appropriate rack must be provided for PID controllers, computers power supply, main switch, power distribution box etc. There must be flexibility on positioning and layout of racks to enable optimum working practice in our laboratory.

6. BAKE-OUT TENT and/or arrangements for the Chambers and ion pump

- Bake-out equipment to bake out the system including the growth chamber, ion-pump, and preparation chamber
- appropriate radiation heaters must be part of bake out package alongwith fan for a homogeneous temperature distribution inside the bake out area
- Proper bake out controller for the chambers

7. UTILITIES/SPARES

A. Utiliies

Tool case for minor maintenance work incl. helpful accessories:

- Various suitable wrenches, screwdrivers, Allen® keys, pincers etc.
- Torch light, graduated metal rule, level, glass fiber pencil etc.
- High temperature grease for lubrication of air-side mechanics
- Set of spare sealing

B. Spares

- Complete set of gaskets (15 no. of each type/size of flanges, Silver coated)
- Spare filaments (4 nos. for RGA, each ion Gauges)
- Fuses (20 nos. For each type)
- TSP filaments (10 nos.)

OPTIONAL ITEMS:

1. Load lock:

UHV stainless steel chamber with flanges for connection to the preparation chamber, a transfer rod, fast loading door, pumping system including appropriate turbo pump and vacuum gauges wide range gauge. Must attain base pressure of 10^{-8} mbar. VAT valve for putting in between preparation chamber and load lock. Must have sample storage for atleast for three samples. IR heating for special lamp heating unit to bake out the samples and remove water quickly.

2. UHV Planar magnetron source 2"

- Target Diameter: 2"
- Must be bakeable upto 200C
- Water cooling
- Pneumatic shutter.
- Must allow for DC, RF and AC operation
- Must allow both magnetic and non-magnetic target for deposition
- Must be compatible O₂, N₂, and Ar

3. Beam Flux Monitor

- Mounted to a UHV linear feedthrough
- Must include filament protection tube as shielding in home position
- He leak checked, tested in UHV
- Bakeable up to 200°C
- With power supply
- With connection cables and suitable connectors

4. CCD camera for imaging RHEED data and RHEED analysis software

5. Appropriate Water Chiller

6. Appropriate Air compressor

7. Cryo trap/baffle for TMP

8. Wobble stick for substrate manipulation in growth chamber

9. LN2 Dewar

Other required terms & conditions:

- i. Layer growth training/material specifications.
- ii. The vendor must have the proven capability to provide a thorough epilayer demonstration programme. Installation and Training at user site should be provided.
- iv. Prospective suppliers must provide training for epitaxial growth for at least three days on the fully installed instrument. The source material and substrate for training to be provided by customer.
- v. It is essential that the scientist(s) delivering the programme is (are) a full – time employee(s) of the system vendor and is (are), as such, expert and fully conversant with every aspect of machine operation, functionality and the philosophy of the design that led to its development. Further, the training manager(s) must be accessible for consultation beyond the completion of the scheduled epi-layer demonstration.
- vi. **Utility power:** 230 V single or 440 V three phase, 50Hz. Total power consumption of the system under full operation should be mentioned. UPS requirements for the system should be mentioned.
- vii. **Applications support:** The vendor must provide evidence that there lies embedded at the core of the company, a true applications culture that has evolved and continues to evolve with the companies technology interests. Application support that is void of heritage and pedigree will be viewed less favourably than otherwise.
- viii. User reference list worldwide should be attached. A minimum of 5 successfully installed MBE system of similar type worldwide in the past 5 years.

ix. Hard and soft copies of all relevant documentation including operating manual, service manual etc., run up to epitaxy, source loading, installation should be provided.

x. Warranty for one year after the date of installation. Additional AMC for 4 years beyond the warranty period should also be quoted for.

xi. System Functionality to be demonstrated

- Functionality of water cooling and media distribution
- Functionality of effusion cells, PID controllers and shutter mechanisms
- Functionality of sputter guns
- Functionality of sample transfer, sample heating and sample rotation
- Achievement of Vacuum levels as per tender requirement for all the chambers
- Simultaneous co-deposition functionality of effusion cells

xii. Layer homogeneity

Achievable film homogeneity better than 1% over 10x10mm wafer must be demonstrated after showing the vacuum specification. A maximum of 2.5% edge area of the substrate may be excluded from this measurement. All required materials, and homogeneity measurement tools for characterization will provided by the customer in state-of-the-art quality. The customer covers all costs for materials and characterization for the growth.