

Global Tender Notification for setting up a laser ablation ICPMS facility at the Indian Institute of Science, Bangalore

Date 17/02/2022

The Centre for Earth Sciences (CEaS) wishes to set-up a laser ablation ICPMS facility for in-situ geochemical analyses of natural as well as synthetic samples. The samples will include silicate glasses and carbonates. The laser will also be utilized for future in-situ isotopic measurements. This is a Request for Quote (RFQ) for the procurement of: (i) 193 nm ArF excimer laser which will be attached to an ICPMS for in-situ measurements of concentrations of elements in solid samples as well as for isotope ratio measurements in the future and (ii) a single collector quadrupole ICPMS for measurements of concentrations of elements in liquid as well as solid samples (in-situ, laser ablation). It may be noted that the Centre already hosts several mass spectrometers for geochemical and isotopic measurements (ICPMS, TIMS, IRMS, QQQ-ICPMS, ICP-OES) as well as two state-of-the-art clean laboratories.

I Procedure:

1. Vendors will be required to submit a technical proposal and a commercial proposal in two separate sealed envelopes. The technical bid should contain all commercial terms and conditions, except the price. Only vendors who will be adjudged by the committee to meet the technical requirements will be considered for the commercial negotiation.
2. Vendors who manufacture only an excimer laser can either submit technical and commercial proposals only for a laser or can team up with vendors manufacturing an ICPMS and provide combined proposals. Similarly, vendors who manufacture only an ICPMS can either submit technical and commercial proposals only for an ICPMS or can team up with vendors manufacturing excimer lasers and provide combined proposals.
3. The deadline for submission of proposals is the March 11, 2022, 5:00 PM Indian Standard Time. Proposals should arrive at the Main office, Centre for Earth Sciences, Indian Institute of Science, Bangalore 560012, India, on or before the above deadline.
4. C.I.P. Bangalore basis (by Air Freight only). The quotation should mention the terms of delivery, delivery schedule, estimated delivery date, and payment terms.
5. The decision made by the purchase committee is final.
6. The technical bid must contain a point-by-point technical compliance document. The technical proposal should contain a compliance table with 5 columns. The first column must list the technical requirements, in the order that they are given in the technical requirements below. The second column must provide specification of the instrument against the requirement (please provide quantitative responses wherever possible). The third column should describe the compliance with a "YES" or "NO" only. Ensure that the entries in the column 2 and column 3 are consistent. The fourth column should clearly state the reasons/explanations/context for deviations if any. Without clear explanation, just stating YES" or "NO" will not be considered. The fifth column may contain additional remarks. It can be used to highlight the technical features, qualify response of previous columns, or provide additional details. Technical capabilities of any suggested accessories/add-ons that may enhance the usability, capability, accuracy, or reliability of the tool should be added. Vendors are encouraged to quote for as many add-ons/upgrades as their tool portfolio permits. Vendors are encouraged to highlight the advantages of their tools over comparable tools from the competitors. Relevant technical datasheets should be provided. The committee

reserves the right to cross-check the information in these datasheets with publicly available information. Items in addition to that listed in the technical table that the vendor would like to bring to the attention, such as data sheets, technical plots etc. can be listed at the end of the compliance table. Vendors are also encouraged to highlight the advantage of their instruments over comparable instruments from the competitors. If multiple systems/instrument models can fulfil the requirements, vendors may submit multiple offers.

7. The technical proposal will be evaluated against the technical requirement. Slight deviations from the technical specifications requested are allowed. Such deviations must be highlighted and justified. Their acceptance or rejection will be left to the discretion of the technical committee. Only the vendors, adjudged by the committee to be suitable to meet the technical requirements, will be considered for the commercial negotiation.
8. The commercial bid must contain:
 - a. Itemized cost of the system and required accessories, such as software, power supply, etc.
 - b. All accessories needed for the instrument to function as per the technical specification must be listed.
 - c. itemized cost, as an option, for any suggested accessories/add-ons that may enhance the usability, capability, accuracy, or reliability of the tool. Vendors are encouraged to quote for as many add-ons as their tool portfolio permits.
 - d. The cost of shipping plus insurance up to the site of installation at IISc must be included. IISc will provide necessary duty exemption documents to the shipping company to take care of the customs clearance at Bangalore Airport.
 - e. Please indicate the warranty provided with the individual instruments or as a clubbed offer. Warranty of 3 years or more is preferred.
 - f. Provide itemized cost for required/expected spares for 3 years of operation. For sake of this calculation, the vendor may assume active instrument usage of 40 hours/week.
 - g. The cost of annual maintenance contract (AMC). The details of AMC are given below.
 - h. Length of time that the instruments will be supported with service and spares from the date of completion of installation. Our requirement is that the instruments be supported for at least 5 years from the date of installation.
 - i. The commercial bid should indicate the following separately: (a) equipment price (b) optional items (c) Freight and insurance cost (d) Shipping cost and (e) the Total cost.
9. As an additional option, provide cost of an annual maintenance contract (AMC) for 3 years, post warranty. The AMC must cover 1 scheduled and 1 emergency visit per year. The emergency visit should be supported with a 48-hour response window. Clarify if maintenance will be done by a trained onsite operator (IISc user) or a specialist from the company. Clarify if maintenance will be done by a trained engineer from India (local representative or Indian subsidiary) or by a trained engineer from abroad. Additionally, include an itemized list of spares (e.g., maintenance kits) that are essential for scheduled visits.
10. The commercial bids will be evaluated based on life-cycle cost of the instruments. This includes the cost of purchase, maintenance, spares, etc. The final decision will be made by the committee.
11. Vendor should also provide the necessary documentation / pictures for preparing the site
12. Provide references of 5 previous installations with similar requirements, preferably in India. Please provide the names and contact addresses of the referees, so that the committee can contact them independently. Details of such systems with model numbers and users should be provided.

II General terms and conditions

1. The institute reserves the right to accept or reject any bid, or to annul the bidding process and reject all bids, at any time prior to the award of contract without thereby incurring any liability of the affected bidder or bidders.
2. Previous installations can be used by the committee to disqualify vendors with poor track record of service, build quality, system performance or poor availability of spares.
3. The bidder must not be blacklisted/banned/suspended or have a record of any service-related dispute with any organization in India or elsewhere. A declaration to this effect should be provided.
4. The vendor should be able to repair and maintain the equipment once it is installed. Clarify if periodic (preventive) maintenance can be done by a trained on-site engineer (i.e. IISc employee) or requires a specialist from the OEM. The bidder should have qualified technical service personnel for the equipment based in India and must assure a response time if <24 hours after receiving a service request.
5. All the quotations must be valid for at least 120 days at the time of submission.
6. The quotations should clearly indicate the terms of delivery, delivery schedule, tax, and payment terms.
7. In case of the award of purchase order, the vendor must provide an Order Acknowledgement within 30 days from the receipt of the Purchase Order.
8. The lead-time for the delivery of the equipment should not be more than 3 months from the date of issue of our purchase order.
9. The bidder is responsible for the delivery and installation of the equipment in the IISc campus.
10. Necessary training to operate the procured setup and required literature support (in English language) should be provided without additional cost.
11. Bidders should undertake to support the system with spares and software bugfixes, if any, at least for the next 5 years.
12. Data must be supplied along with the technical compliance documents. Technical bids without supporting data can be deemed as technically non-compliant.
13. Printed literature and published papers in support of all compliance to the prescribed specifications are encouraged.
14. All guaranteed specifications will have to be demonstrated, upon request, in an active installation. Failure to demonstrate any promised specifications will be deemed as technical non-compliance.
15. Technical evaluation by the institute must include demonstration to verify functionalities and capabilities

of the system quoted. Any discrepancy between the promised specifications and demonstrated specifications will be deemed as technical non-compliance. If need arises, the vendor must be ready to physically visit IISc for a techno commercial discussion.

16. The intender reserves the right to withhold the placement of the final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all the above conditions without assigning any reason.

III. Technical specifications

Laser:

- 193nm ArF Excimer laser source
- Pulse length: less than 9 ns
- Pulse to pulse stability must be < 2% RMS
- Frequency max (Hz): 300 or better
- Repetition rate (Hz): 1-300 or better
- Energy density (J/cm²): 0.5-15 or lower
- Aperture (mm): 1-150 or better (adjustable or fixed slot)
- The laser must be able to be operated with 100% duty cycles
- The laser should be able to be operated in single shot, burst, continuous, and fixed dosage modes
- Water-cooled laser source (preferred, not mandatory)
- Allows energy measurements at the point of ablation in the sample chamber and preferably log energy measurements during scans
- Eye safe – Class I – during operation and maintenance
- Power Source: 230V/50Hz

Sample Chamber:

- Sample chamber: HeIEx, Cobalt or equivalent
- 100mm x 100mm (X, Y)
- high performance sample chamber for analysis and accommodation of large and small sample types.
- Universal sample holder for stubs and slides.
- Stages Featuring larger format 100mm high accuracy, high speed stages.
- XYZ translation (mm): +/- 50 or better, should have linear encoders with sub-micron resolution
- Sample chamber should have a vacuum/purge cycle to remove atmospheric gases
- Easily swapped short-pulse and long-pulse options available
- Purging mechanism, time, and volume of gas consumption should be specified

Lighting and Viewing System:

- High intensity, LED based, transmitted, ring and coaxial light source (independently operated). Software controlled polarizers.
- High resolution video microscope ($\leq 2 \mu\text{m}$) with secondary large field of view camera navigation system

Gases:

- Must include an integrated cabinet (enclosed) containing all laser gas bottles
- Must include fully automated gas exchange system that ensures that laser remains in perfect operational condition
- Internal gas control including integrated micro-Mass Flow Controller, and extra MFC (up to 2) for N₂ and He addition

Software and control PC

- Integrated control PC and software featuring auto-focus and sample image import capability.
- The software must have the ability to import a wide range of image files and overlay a re-coordinated image on top of the laser image for easy targeting of features of interest
- The laser log file output must be compatible with HDIP data reduction and imaging software
- Software Programming: English Version is required, and rewrite programming service is required if necessary.
- The laser software should have demonstrated compatibility with both quadrupole and sector field ICPMS instruments as well as MC-ICPMS from different established manufacturers.

Consumables and standards:

- A complete set of essential and comprehensive accessories/consumables/spares/sample should be quoted per year basis for 3 years of operation.
- Any other consumable required for smooth operation of system must be quoted separately. (List of comprehensive and essential consumable must be mentioned in tabular form with individual cost of the item)
- International standards for concentration measurements of silicate and carbonate rocks must be provided or quoted separately

Other requirements:

- Details of maintenance and service support should be described
- Operation and service manual shall come with the equipment.

Warranty

- Warranty service that includes parts and labour for at least 24 months, which shall begin after successful commissioning of the equipment. Please also quote subsequent (i) comprehensive maintenance cost (parts & labour) and (ii) maintenance cost (labour only) after expiry of the warranty period.
- The warranty should cover all laser components that are not considered consumables. Spare of beam path optics that are consumables and replacement dependent on number of laser shots and energy applied for back-up should be provided.
- The resonator optics and beam splitter are covered in the warranty.
- Equipment installation, commissioning tests and training should be included in the tendered price. Format of the above tasks either by site visit or remote instruction should be listed out.

Support Service

- Online support includes phone, e-mail, and internet-based remote access within 24-48 hours of initial contact.
- On-site service is included, as deemed necessary, following online evaluation. Goal to provide on-site service within 48 hours once a service call has been entered based on engineer availability.

Single collector ICPMS:

Sample introduction, ion source, RF plasma:

- Sample Introduction Kit including Peltier Cooled Spray Chamber (preferred temperature Range -5 to 20 Deg C), PFA/ Glass/Quartz Nebulizer, Ni (or Pt) Sample and Skimmer cones.
- Complete set Suitable Accessory along with organic kit and MFC for oxygen to aspirate organic samples directly.
- Computer controlled 27 MHz RF generator operating from 500 (or lower) to 1500 watts (or more) for automatic control of torch ignition, shutdown, and system warm up.
- The system should be able to change over from normal Plasma conditions to cool Plasma with direct control from software.
- The Plasma torch should have provision for software-controlled alignment for horizontal position, vertical position, and sampling depth (X, Y, Z direction).
- Standard large orifice Ni sampling (1.1 mm ID or suitable) and skimming (0.5 mm ID or suitable) cones with suitable diameters.
- The ion deflection system should have efficient mechanism for removing all neutrals from the Ion path.
- The ion path must be maintenance free or should have minimum maintenance

Gases, Cell technology and mass flow controllers

- System should have dedicated MFCs to control plasma, auxiliary, nebulizer, additional / dilution gas, reaction gases, collision gases, high TDS & oxygen for organic samples.
- The system must either have chemical or physical resolution to separate polyatomic and isobaric interferences from the following masses: 39K, 52Cr, 55Mn, 56Fe, 75As, 78Se, and 80Se in both HNO₃ and HCl matrices.
- For chemical resolution: The system should have reaction and collision cell with controlled reaction capability to carry out mass shift reactions.
- For physical resolution a range of $\Delta M/M$ of 300-1200 or suitable is desirable.
- ICPMS shall incorporate Cell offering operation: Standard Mode, Collision Cell (He) Mode with KED and Reaction mode for interference removal in a single analytical method simultaneously.
- Cell must be non-consumable with zero maintenance. If it is a recurring consumable, then additional 2 cells should be quoted along with main system.
- There should be four gas specific mass flow controllers for collision and reaction gas for He, H₂, NH₃, O₂ or suitable in a safe premix or pure form and compliant manner. The offered instrument should have factory fitted MFCs as a standard feature. System should have the capability to handle an additional of min 15 CRC gases based on request and instrument hardware design

Mass Analyser

- Resolution should be variable (0.3-1 u or better) across entire mass range for improved dynamic range and extended sensitivity
- Minimum Unit mass (1 amu) resolution capability
- Mass calibration assessed and automatically updated.
- The Mass range should be from 4-260 u or better
- Scan speed: 3000 u/sec or better at 40 mass intervals
- Mass stability: ≤ 0.05 amu per day or more.

Detection and performance specifications

- The ion detector should be a dual mode discrete dynode electron multiplier (or equivalent) with 10 order or more magnitude of dynamic range
- The dual-mode detector assembly must come standard with the system.
- Minimum dwell time of 100 μ s or better in pulse and analog.
- Sensitivity specifications (must be demonstrated during installation):

Sensitivity (Mcps/ppm):

- Li/Be: ≥ 6
- In/Y: ≥ 100
- U/Tl: ≥ 80

Detection limits (ppt):

- Li/ Be: < 0.50
- In/ Y: < 0.25
- U/ Bi: < 0.25
- 32S (as SO⁺): < 200 or suitable
- 31P (as PO⁺): < 50 or suitable
- 78Se: < 1 or suitable
- Oxide ratio: CeO/Ce $< 2\%$ or better
- Ba⁺⁺ or Ce⁺⁺/ Ba or Ce $< 2\%$ or better
- Background mass 4.5/9/220: No gas < 1 cps
- Short Term Stability $\leq 2\%$ RSD or better
- Long Term Stability $< 3\%$ RSD or better
- Mass Stability $< \pm 0.05$ u per day

Software and control PC

- Suitable Data Station with all Software controls & future upgrade controls with Instrument software.
- Software should provide comprehensive functionality for analysis through fully automated process with auto tuning.
- The software should have data handling and data management, Data security and access control with 21 CFR part 11 or suitable GLP environment supports, compliance management and customizable reporting etc.
- The system should have Server connectivity and should be compatible with 21 CFR Part 11. There should be facility for automatic data transfer from ICPMS PC to central server.
- Minimum 2 offline software licenses must be provided as standard
- The software must be a 64-bit application for future upgradeability.
- The future software upgradeable should be free of cost.
- System should be upgradable with suppressor-based separation system using integrated single window-based software operation for all the modules connected with MS.
- Branded HP/Dell Personal Computer should be supplied along with instrument from manufacturer.

Consumables and standards:

- A complete set of essential and comprehensive accessories/consumables/spares/sample should be quoted for 3 years of operation. These include sampler and skimmer cones (Ni and Pt), PFA nebulizer (with both detachable and integrated probe), spray chambers, plasma torch, injectors, online dilution kits, tubing, gaskets, pump oil, preventive maintenance kits, etc.

- Any other consumable required for smooth operation of system must be quoted separately. (List of comprehensive and essential consumable must be mentioned in tabular form with individual cost of the item)
- International standards for concentration measurements of silicate and carbonate rocks and water must be provided or quoted separately

Warranty

- Warranty service that includes parts and labor for at least 24 months, which shall begin after successful commissioning of the equipment and demonstration of working and data generation. Please also quote subsequent (i) comprehensive maintenance cost (parts & labour) and (ii) maintenance cost (labour only) after the expiry of the warranty period.
- A 3-year extended warranty and/or AMC must be included in the quote as separate component
- Equipment installation, commissioning tests and training should be included in the tendered price.

Support Service

- Online support includes phone, e-mail and internet-based remote access within 24-48 hours of initial contact.
- On-site service is included, as deemed necessary, following online evaluation. Goal to provide on-site service within 48 hours once a service call has been entered based on engineer availability.

Other requirements:

- Details of installation-site requirements, maintenance, and service support for both the laser and the ICPMS should be described
- Details of gases, purging setup, gas lines, regulators, cylinders necessary for both solution ICPMS and laser ablation ICPMS should be provided and should be quoted separately
- Operation and service manual should come with the equipment.
- Suitable UPS with 30 min Backup to cover ICPMS, laser ablation, exhaust system, autosampler, chiller, PC, printer
- Autosampler of minimum sample vial holding capacity of 200 positions or more should be offered. It should be metal-free and should have independent X-Y-Z movements.
- Vendor must give list of references in India and elsewhere in the world where the quoted or similar system is working satisfactorily (both for solution ICPMS and laser ablation ICPMS)
- Vendor must give a minimum of 5 days of onsite training after the installation for practical demonstration for both solution ICPMS and laser ablation ICPMS. During this training, samples provided by the end-user must be analyzed; data quality will be assessed based on analyses of samples provided by the end-user.

IV - Terms and Conditions:

1. The tender document should be in English and be submitted in two bid system, i.e., Technical bid, and Commercial bid in two sealed envelopes with commercial or technical bid clearly indicated on the envelope. These two sealed envelopes should be placed within a larger envelope and “Laser ablation ICPMS bid – Ramananda Chakrabarti, Centre for Earth Sciences, IISc” should be written on the outer envelope.
2. The technical bid must include all details of technical specifications of the instrument along with commercial terms and conditions masking only the price component. Bill of materials, brochures, technical datasheets, and any other document may be enclosed to help the evaluation of the technical bid. Please also include warranty terms and any other information on upgradation terms/extra accessories in the technical bid.

3. The technical bid must clearly state the specifications of the main instrument (A) along with the accompanying standard items and all other details including the warranty terms (B-I) as specified in section 3 of this document.
4. The commercial bid must include the base price of the instrument delivered in place and all components including controller accessories plus any additional GST component.
5. The commercial bid must indicate detailed component-wise and itemized price breakup and must include optional items/accessories.
6. Bidder should have well established own establishment. Enclose Company Registration Certificate, PAN, 3 years of audited balance sheets and turnover.
7. In the technical bid include the complete details all components of the main instrument and the accessories as to whether they are sourced locally or foreign made/imported along with the manufacturer and sourcing details.
8. The vendor should have a good track record of having previously supplied similar equipment in India or elsewhere in the world (Please furnish complete details including names and contact addresses). Reference letters may be sought by the committee to arrive at the decision.
9. The vendor should have qualified technical service personnel for the instrument based in Bengaluru.
10. Bidder should have executed at least three order of similar instrument in India in the last 2 years. (Please provide copy of purchase orders and details).
11. The bidder should provide a list of national and international publication resulting from the data of the instrument.
12. The Bidder should not be currently blacklisted by any institution, bank in India or abroad (Please provide self-declaration).
13. No advance payment will be made, the payment will be made after delivery and installation of equipment.
14. Agency commission (not encouraged) if any should be clearly mentioned and detailed in the commercial bid.
15. The lead time for the delivery of the equipment should be less than two months from the date of receipt of purchase order and must be mentioned in the technical bid.
16. If the equipment or any parts/accessories are found to be defective, they must be replaced or rectified at the cost of the supplier within 30 days from the date of receipt of written communication from us. If there is any delay in replacement or rectification, the warranty period needs to be extended by a year and/or face a penalty equal to the valuation of the equipment.
17. The technical bid will be opened first and evaluated.
18. Bidders satisfying the required criteria as stated in Section 2 and 3 as well as the terms and conditions shall only be considered for Commercial Bid opening. Further, agencies not furnishing the documentary evidence as required will not be considered.
19. Following the opening of technical bid, a presentation may be sought from the bidder.
20. During the warranty period, the bidder shall be fully responsible for the manufacturer's warranty in respect of proper design, quality, and workmanship of all the systems supplied. If there is any delay in replacement or rectification, the warranty period needs to be extended by a year and/or face a penalty equal to the valuation of the equipment.
21. During the warranty period, the bidder shall attend to all the hardware problems on site and shall replace the defective parts at no extra cost to the purchaser.
22. The Engineers of the parent manufacturer or bidding firm must install, demonstrate, and provide the training on laser ablation ICPMS for two days at IISc, Bangalore without additional cost.
23. The bids should be valid for at least 90 days from the last date of submission of the quotation.

24. The price should be quoted in INR only. The cost should be inclusive of delivery till the IISc campus. Price offer must be on FOR-IISc Bangalore basis. Please note that IISc being a DSIR recognized research institution under GST notification no. 47/2017 and the items under this procurement is required for research purposes only, is eligible for reduced GST (5%). Please also include any available educational discounts in the commercial bid. IISc may issue the GST Exemption Certificate upon a formal request from the vendor along with a copy of invoice.
25. The decision of the purchase committee will be final.
26. IISc, Bangalore reserves the right to accept or reject any bid and to annul the bidding process and reject all bids at any time to award of construct without thereby incurring any liability of the affected bidder or bidders.
27. Tender documents that do not satisfy the “Terms and Conditions” listed herein will be disqualified.
28. The tender documents should be sent to the following address no later than 11/03/2022 5:00 PM IST.

The Chairman (chair.ceas@iisc.ac.in)
Centre for Earth Sciences, Indian Institute of Science
C. V. Raman Road
Bangalore 560012
Karnataka, India.
Attn: Ramananda Chakrabarti (ramananda@iisc.ac.in)