



WADIA INSTITUTE OF HIMALAYAN GEOLOGY,
(An Autonomous Institution of Department of Science & Technology
Government of India)
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OPEN TENDER DOCUMENT

TECHNICAL BID DUE TO OPEN ON 21 January 2021

NO S-2 /188-P (TQ-ICP-MS) WIHG/2020-21 / 3

Dated: 23-12-2020

Sub: INVITATION OF TENDER

To

Dear Sirs,

We intend to purchase '(Inductively Coupled plasma mass spectrometer with Laser Ablation system (LA) as per the details/specifications (Annexure-1). You are requested to submit your sealed tender/Quotation/Proforma Invoice along with compliance statement (Annexure-2) and technical literature/Brochure for the same on your own letterhead. **Bid without Compliance statement and Technical literature /Brochure will be summarily rejected.**

Sl. No	Description of Items	Quantity
1	Triple Quadrupole Inductively Coupled Plasma Mass Spectrometer (TQ-ICP-MS) with Laser Ablation (LA System) Specification As Per Annexure-1	01 No.

TERMS AND CONDITIONS

1. Detailed terms & conditions of supply MUST be mentioned in your offer
2. Minimum three years on-site Comprehensive warranty form the date of installation of complete set up of TQ-ICP-MS and LA, UPS, Gas Panel, Fume Hood/Exhaust etc. (Except consumable items. Extended warranty offer for five years is desired (Optional). The warranty clause on these lines **MUST** be clearly mentioned on both technical and commercial bids. Offers with other warranty clauses will not be considered. After sales service facilities in India should also be available. Details of warranty/guarantee and the after-sales service facilities available in India must be specifically mentioned in your offer, failing which the offer is liable to be rejected.

Continued on page '2'

3. The sealed tenders/quotations/offers are to be submitted in **two parts** as under:-
The technical and commercial bids should be submitted on your own letterhead in separate Sealed envelopes. **Your technical bid should be submitted in one of the sealed Covers superscribed "Triple Quadrupole Inductively coupled plasma mass spectrometer with Laser Ablation system (LA) due to open on 21-01-2021 the other sealed envelope should contain your commercial bid and should be super scribed "Commercial offer for "Triple Quadrupole Inductively Coupled plasma mass spectrometer with Laser Ablation system). Both these sealed envelopes should be submitted in a third sealed cover Superscribed "Inductively coupled plasma mass spectrometer with Laser Ablation system (LA) "due to open on 21-01-2021**

The undermentioned documents/details **MUST** be submitted with your technical offer:-

- a) Relevant technical literature
 - b) Details of training and after-sales-service facilities available.
 - c) Details of warranty (elaborative as per term No. '2).
 - e) Details of users and copies of the user certificates of the proposed model/make of (**Triple Quadrupole Inductively Coupled plasma mass spectrometer with Laser Ablation system (LA)**)
 - f) Details of para wise /item wise compliance statement. (As per annexure-2)
4. For indigenous supply, rates **MUST** be for delivery on F.O.R WIHG. Dehra Dun basis. Only GST@ 5%, as applicable, will be paid extra by us (Against Certificate issued by the head of the institution). You may take note of Govt Notification No 47/2017 integrated Tax (rate) dated 14th November, 2017.
5. **Earnest Money Deposit:**
- (i) **For Indigenous Original Equipment Manufacturer or Their Authorized Dealer -:**Notwithstanding anything contained in rule 171 of GFRs 2017 or any other Rule or any provision contained in Procurement Manuals, no provision regarding bid security is being kept with this bid document. However, the bidders are required to submit Bid Security Declaration as notified by Procurement policy, Department of Expenditure, Ministry of Finance, Government of India vide there Office Memorandum no. F.9/4/2020-PPO dated 12-11-2020.
 - (ii) **For Overseas Original Equipment Manufacturer or Their Authorized Dealer-:** The bid should be accompanied by FDR /Bank Guarantee towards earnest money for an amount of Rs 4,50,000.00 (Rupees Four Lakh Fifty thousand only) **or its equivalent foreign currency. The EMD MUST be submitted with the Technical bid in the shape FDR/Bank Guarantee in the name of the Director, Wadia Institute of Himalayan Geology, Dehra Dun (India),** failing which the offer will not be considered. The Bank Guarantee shall remain in force up to and including forty five (45) days after the bid validity.
6. Being a Research & Development Institution, we are exempted from payment of excise duty and are entitled for payment of basic custom duty on concessional rates. Therefore, Indian Suppliers are advised to quote their rates accordingly.
7. 100% payment to overseas suppliers will be made by us through wire/Telegraphic Transfer. However, 80% payment will be released on receipt of consignment and the balance 20% Payment will be released after satisfactory installation/commissioning, acceptance of supply and necessary onsite application training.
8. Commercial offer from overseas manufacturers/suppliers **MUST** be submitted on the Following lines and must be for supply on f.o.b. basis:
- (a) Ex-works cost.
 - (b) (-) Less Indian Agent's Commission, if any, payable in Indian currency after satisfactory Installation and acceptance of supply.
 - (c) Net ex-works cost.
 - (d) f.o.b. charges up to international airport of dispatch in supplier's country
 - (e) Net f.o.b. cost

9. Installation of the equipment will be done at Wadia Institute of Himalayan Geology, Dehradun. In case Operational training is required training charges (if any) should be mentioned Separately in the offer, failing which the offered rates will be treated as inclusive of training charges. Installation and training clauses MUST be clearly mentioned in your offer (both in technical and commercial bids).

10. **Pre-Installation requisites**

- Comprehensive guidelines for the development of the pre-installation infrastructure including requirement of UPS, AC, transformer etc. with their specification. It will be the responsibility of the vendor to insure that the all necessary essential accessories and ancillary items are quoted for carrying out the standardization, optimization and calibration for objective applications including standard, chemicals, gases and consumables.
- The supplied system should be complete in all aspects to take the sample analyses at WIHG premises.
- The institute shall provide none other than three phase electricity line and appropriate laboratory ambience.

Installation and Acceptance Testing

- Installation and acceptance testing requirements should be explicitly mentioned along with the technical bid/ specification.

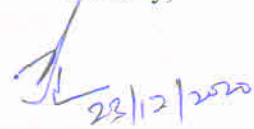
11. **Training**

- Onsite application training for TQ-ICP-MS and LA system by original equipment manufacturer (OEM) Engineers for at least 1 weeks working (excluding installation time line) should be given except installation and commissioning at WIHG, Dehradun, India, which will also include real sample analysis quantification using different method files.

12. Delivery period required by you MUST be clearly mentioned in your offer.
13. Your offer MUST be valid for a minimum period of **one hundred twenty days** from the date of opening of technical bids and validity period MUST be mentioned in your offer. Air-freight charges on imported consignment will be paid by us in India in Indian currency. Insurance of the imported consignment will also be arranged by us.
14. Your offer MUST reach us by 13.00 hrs. on **21-01—2021**. In your own interest, the tenderers must ensure that their tender reaches us in time. Tender will be opened at 15.00 hrs. on the same day. Late tenders or delayed tenders will not be considered. In case the due date happens to be a closed day because of any of the reasons, tenders will be opened at 3 p.m. the next working day.
15. In case Indian Agents submit offer on behalf of their overseas principals, proper authorization certificate from the principals on their (Principals) letterhead MUST be submitted in original with the technical bid, **failing which the offer will not be considered.**
16. Security Deposit: - Before placement of necessary Purchase Order, the successful tenderer will have to submit security deposit @3%of order value in the shape of a Fixed Deposit Receipt/Bank Guarantee that shall be valid till completion of warranty period.
17. Risk Purchase Clause: - If the supplier fails to supply the goods in correct quality and quantity within the stipulated delivery period, liquidated damages @1% per week for a maximum period of ten weeks will be deducted from the balance payment of the supplier. If the ordered materials are not supplied even after the delay of said period of ten weeks, termination/cancellation of the order will be considered and in such a situation, the purchaser will have the right to forfeit the security deposit of the tenderer and procure the material(s) or services from elsewhere upon such terms and in such manner as it deems appropriate and the supplier shall be liable to pay the purchaser for any excess costs for such similar goods or services.

18. Résolution of Disputes: All désagréments, disputes, différence that may arise Between The Wadia Institute of Himalayan Géology and your firm/agency which cannot be resolved through mutual négociations shall be referred to an Arbitrator appointed in Accordance with the provisions of relevant Indian or International Law as the case may be. The venue of the proceedings and arbitration shall be Dehradun, INDIA.
19. Amendement(s) in the tender documents required if any, will bé made available in our web site and accordingly, the prospective bidders are required to keep themselves updated till four days of tender opening.
20. The Director, Wadia Institute of Himalayan Geology, Dehra Dun (India) reserves the right to reject any or all tender in public interest without assigning reasons thereof.

Yours faithfully,



(MK Biswas)
Store & Purchase Officer, for Director

Technical Specifications for the procurement of Triple Quadrupole Inductively Coupled Plasma Mass Spectrometer (TQ-ICP-MS) with Laser Ablation (LA) System

Preamble:

Wadia Institute of Himalayan Geology, Dehradun, a premier research institution carrying out research in the field of Himalayan Geology invites sealed tenders for the procurement and commissioning of a high-Resolution Inductive Coupled Plasma Mass Spectrometer along with Laser Ablation Microprobe (LAM) on turnkey basis to obtain high-quality results on both liquid and solid mode, as per the key specifications given below.

Our analytical needs are:

- In solution analyses of all major and trace elements (2 to 260 or more amu) abundances, rare earth elements (REEs) and platinum group of elements (PGE) in geological and environmental samples/materials with detection limits down to ppt level.
- In-situ analyses of major and trace elements (2-260 or more amu), rare earth elements in minerals, natural materials, glasses, ceramics, metals, alloys, etc. with detection limits down to parts per trillion (ppt) level using Laser Ablation Microprobe.
- Provision for in-situ U-Pb isotopic analysis of various minerals like monazite, rutile, baddeleyite, zircon etc. using LAM in conjunction with TQ-ICP-MS.

(KEY SPECIFICATIONS)
TQ-ICP-MS

TQ-ICPMS: This system should consist two quadrupoles and one collision/reaction chamber

<u>Sample introduction system</u>	<p>The sample introduction should have easy change-over from one type to another (liquid mode to solid mode) including Laser Ablation interfacing.</p> <ul style="list-style-type: none"> • Standard sample introduction system must consist of HF/PFA Kit (nebulizer, peltier cooled spray chamber, torch, injector), cones (sample and skimmer cone (platinum)) & Tubing set. • The sample introduction system should have significantly low dead volume(quick washout) with option for low uptake rate(150 micro-L/min or lower) sample introduction. • The sample introduction system, torch, lenses and cones should be easily accessible for maintenance. • Additional two set complete HF/PFA resistant kit including inert nebulizer, PFA spray chamber, inert torch, inert injector, tubing set & cones set. • System should have the capability to handle concentrated solutions for direct aspiration (having
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	<p>high 25% TDS with direct aspiration) along with fully automated & software controlled single accessories with 100-fold Argon gas or liquid dilution without utilizing manual Internal Standard Accessories. Published supporting documents must be enclosed.</p> <ul style="list-style-type: none"> • It should have computer controlled peristaltic pump with appropriate number of channels and rollers. • An auto-sampler with minimum 200 Vials, with complete enclosures of ducts and exhaust. Autosampler must have wellplate/microplate kit to analyze low volume samples i.e. 700-800μl. 1000 Nos. vessels should be included. • Four Mass Flow controller for plasma, Auxiliary, Nebulizer/sample and Makeup/Additional (Argon Dilution) gas must be offered • Online internal standard kit with splitter and tubing set.
B. Ion Source	<ul style="list-style-type: none"> • Icp source with solid state RF generator at ~27 MHz or better frequency band attached to a 3-4 turn load coil or suitable module with programmable RF power with power range 600 W to 1.6 kW or better with stepsize 10W. • The torch ignition shut down and system warm up should be auto-controlled with software • Torch position should allow for complete computer control and auto-tunable in x-y-z directions with independent movement or as per system requirement • Provision for auto alignment of the torch with reproducibility better than 0.1 mm or suitable in horizontal and vertical directions.
C. Vacuum System	<ul style="list-style-type: none"> • Suitable vacuum system with turbo and rotary pump. • There should be provision for automated vacuum reading at low and high vacuum ends of the mass spectrometers.
D. Ion-extraction interface	<ul style="list-style-type: none"> • System should have water cooled interface • Standard combination of nickel/ platinum sampler and skimmer cone for maximum sensitivity should be provided. Both cones should be easily mountable and demountable. • Cone interface : System must have single cone interface to analyze all kind of samples (i.e high matrix, high sensitivity ,low matrix, Boron matrix etc) ,without any manual intervention or hardware changeover to comply all guaranteed performance specification of system as per

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	published data sheet (i.e. True liner dynamic Range, Detection Limits, Sensitivity, Oxide ratio, Abundance sensitivity etc)
E. Collision and Reaction Cell	<ul style="list-style-type: none"> • The system should contain collision and reaction cell. • System should be capable of utilizing reactive gases as per requiremnt. • Three or more Gas lines along with Mass Flow Controller (MFC) for reaction gas to support various reaction gases in pure or premix form eg. H₂, NH₃, O₂, CH₄, C₂H₂, C₂H₆, N₂O, CO, CO₂, N₂ etc. • For collision helium Gas separate MFC should be offered. • Three or more Gas lines along with Mass Flow Controller (MFC) for reaction gas to support various reaction gases in pure or premix form Eg. H₂, NH₃, O₂, CH₄, C₂H₂, C₂H₆, N₂O, CO, CO₂, N₂ etc.
F. Mass Analyzer System	<ul style="list-style-type: none"> • It should consist of three quadrupoles in order to provide superior ion transmission, resolution and high abundance sensitivity. • The first quadrupole (Q1) before collision/reaction cell & third Quadrupole (Q3) after collision/reaction cell should have unit mass filtering capability as per IUPAC guidelines of triple quadrupole ICP-MS/MS system. • Mass range: 2-240 (or more) amu for Q1 & Q3 along with unit mass filtering capability.
G. Ion Detector assembly	<ul style="list-style-type: none"> • The ion detector should be a discrete dynode electron multiplier unit or equivalent. • Detector should be able to analyze high and low concentration simultaneously with 10 to 11 orders or better true linear dynamic range, not extended dynamic range (EDR) • Minimum dwell time: 100µSec in both pulse count and analog mode. • Both the analog and pulse counting modes should be protected against overload. • Working concentration range of the detectors should be from the detection limit to 1ppb & >1000 ppm without any adjustments of settings such as resolution, detector voltage etc.
H. Software	<ul style="list-style-type: none"> • Should provide compatible and user-friendly software for quantification. It should have templates for simultaneous report generation as soon as the analysis is completed. • The firm should provide software upgrades from time-to-time at least for five years after the

	<p>installation.</p> <ul style="list-style-type: none"> • Software should provide inbuilt methods for areas of our research interest in both solution and LA modes.
I. Performance Specifications:	<ul style="list-style-type: none"> • Please specify sensitivity (in Mcps/ppm or Kcps/ppb) for following elements along with printed proof/certified tested copies on the quoted models: Low mass: Li(7) – 65 or better Mid mass: Y(89) or In(115) - 300 or better High mass: Tl(205) or U(238) - 300 or better • Detection limit (in ppt) Be (9)- 0.5 or better In(115) - 0.1 or better U(238) or Bi(209) - 0.1 or better • Oxide Ratio: CeO^+/Ce^+ : < 2 % or better • Double charged ratio Ce^{++}/Ce^+ < 4.0 • Background (cps) : 1cps or better (LM & HM) • Short term & Long-term stability (%RSD): < 3 • Isotope ration precision for $^{107}Ag/^{109}Ag$ (%RSD): < 0.2 • Abundance Sensitivity: 5×10^{-9} or 0.005ppm or better (LM & HM) • Scanning speed: 3700 amu/sec or better
J. Computer system and UPS:	<ul style="list-style-type: none"> • Original Equipment Manufacturer (OEM) configured suitable PC with dual monitor (24'') and latest model laser color printer must be offered which is compatible with the operation of machine. • 30 KVA UPS with 1 Hour backup from the reputed brands/ manufacturers with one hour back up time with power output quality as per requirement of the instrument.
K. Other Items for Installation.	<p>System should be supplied with</p> <ul style="list-style-type: none"> • NIST calibration multi-element standards 22/23 elements (10ppm; 250 ml) & NIST multi-element calibration standards 22/23 elements including 1000 ppm, 250 ml) • Single element (100 or 10ppm, 125 ml) for Hg & Au. • REE Multi elemental standard mix (17-18 element including U & Th) (250 ml) 100 µg/L (ppb) • 100µg/ml precious metals multi-element (Au, Pd, Rh, Ir, Pt, Ru) 250 ml • 100µg/ml Osmium standards for ICP-MS -200ml • Internal standard mix (5 element & 500ml) • Gas cylinders with regulators: Argon - 04 Nos., Helium - 02 Nos., Reaction gas NH₃, Hydrogen,

ds

	<p>Oxygen– (01 set each), Nitrogen Gas cylinder 01 set. Gas Panel as per requirement. Manifold with four-cylinder capacity for Argon.</p> <ul style="list-style-type: none"> • 10mtr Suitable exhaust fume hood assembly for ICP-MS & Auto sampler • Compact and low-noise chiller unit. • Auto-tuning standards for system check and wavelength calibration.
L. Other Items for Installation.	<p>System should be supplied with</p> <ul style="list-style-type: none"> • NIST calibration multi-element standards 22/23 elements (10ppm; 250 ml) & NIST multi-element calibration standards 22/23 elements including 1000 ppm, 250 ml) • Single element (100 or 10ppm, 125 ml) for Hg & Au. • REE Multi elemental standard mix (17-18 element including U & Th) (250 ml) 100 µg/L (ppb) • 100µg/ml precious metals multi-element (Au, Pd, Rh, Ir, Pt, Ru) 250 ml • 100µg/ml Osmium standards for ICP-MS -200ml • Internal standard mix (5 element & 500ml) • Gas cylinders with regulators: Argon - 04 Nos., Helium - 02 Nos., Reaction gas NH₃, Hydrogen, Oxygen– (01 set each), Nitrogen Gas cylinder 01 set. Gas Panel as per requirement. Manifold with four-cylinder capacity for Argon. • 10mtr Suitable exhaust fume hood assembly for ICP-MS & Auto sampler • Compact and low-noise chiller unit. • Auto-tuning standards for system check and wavelength calibration.
M. ICPMS Consumable (for three years use approx.)	<ul style="list-style-type: none"> • Pt sampler, skimmer cone set (05 sets) • Standard injector and torch – 03 Nos. • Standard spray chamber & standard Nebulizer - 04 Set • Complete HF/PFA inert kit along with PFA Spray chamber, inert nebulizer, Inert torch with injector & pk/12 tubing's set (02 Set) • Standard peristaltic pump tubing for drain (pk/12) – 4 set. • Standard Peristaltic pump tubing for samples (pk/12) – 4 set • Peristaltic pump tubing for ISTD (pk/12) – 2Nos. • Tubing autosampler to peristaltic pump – 6 Nos. • Tubing for spray chamber drain (4.0mm , 2.5m)- 05 sets • PFA sample tubing, 0.5mm id, 1.6mm, 5 m- 08 Sets. • PTFE tubing for internal reaction cell gas, 1/pk (02 set) • Carrier/Make-up/Dilution gas tubing (02 each)

	<ul style="list-style-type: none"> • Sample tubing for nebulizer, 0.5mm, 10/pk • Graphite gasket for Sampling cone (3/pk) -03 set • Oil element/mist filter - 01 sets • Skimmer base for Nickle and Platinum cone (one set each) • Pump oil (1L) - 10 sets • RF coil - 01 set • Screw, spacer and O-ring for cell - 01 sets • Fluid for chiller – 06 L • Cone cleaning solvent /chemical - 04 L • Swab (cotton-tipped both ends) - 200 Nos. • Alumina Powder 100 gm - 02 sets • Autosampler complete tubing set - 01 sets • Autosampler vessels pk/1000
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LASER ABLATION (LA) SYSTEM

A laser ablation system should be fully compatible with TQ-ICPMS (above quoted) to obtain high end results on solid mode

<p>1. Specifications:</p>	<ul style="list-style-type: none"> • Laser - Nd:YAG (UV-213nm). • Attenuator: software controlled Wavelength: 213nm flat beam. • Pulse length: <5ns • Pulse rate/repetition rate: 1-20 Hz or more. • Pulse Energy> 4 mJ/pulse source energy (high density homogenized beam) from the laser head with flat top energy profile. • Laser output energy is adjustable from 0 to 100% • Laser Spot size at sample: 5 micron or smaller to 200 micron or larger. • Spot selection: should be calibrated and computer controlled. • Energy stability: 3% or better. • Controls: programmable with manual override or suitable. • Attenuator: programmable with manual override joysticks or suitable • Apertures 14 selections (12 circular (with 5, 8, 10, 15 20, 25,30, 35 ,40, 50, etc) and 2 square).
<p>Optics:</p>	<ul style="list-style-type: none"> • Zoom video microscope system. • Magnification- selectable variable optical zoom (specify range and steps) • Computer controlled, continuously adjustable parfocal video microscope (2.6x – 32.5x optical zoom range) • Camera- color CCD/CMOS capable of resolving sample features down to a few microns in diameter. • Lighting- software controlled reflected,transmitted and ring light with focusing optics. High intensity LED lighting arrays. • Aperture: Motorized, preferred software control. • Alignment tools: cross hair, pin holes.

	<ul style="list-style-type: none"> • Polarizer: Motorized computer-controlled polarizer.
Mechanical:	<ul style="list-style-type: none"> • Stage: 100mm x 100mm XY translation stage • Sample chamber: Two-inch diameter ablation cell with removable quartz window. • Aerosol transfer line: should be rigid straight piece from cup to external connection with no bend which can change bend radius with stage translation • Fast washout 2-volume HelEx II cell must also be quoted. • System should have possibility to upgrade in future for specialized sample cells i.e. Frame Laminar Flow cell, Spring Document Cell and Large Format Cell. • Purging: sample chamber should have proper gas purging arrangement. • Stage: should have software-controlled X, Y and Z movement with micron level resolution. Sample map navigation, depth profiles. • Viewing window: sample chamber should have a direct view window. • Sample introduction into plasma: Mass flow controller for carrying ablated material into the ICP- MS.
2. Computer and Software:	<ul style="list-style-type: none"> • Compatible PC with updated Windows OS (latest version) compatible to 213 Nm Nd-YAG laser ablation system.. • On screen display of safety interlocks and laser status. • Synchronized ablation control with host ICP-MS (universal external trigger as standard, fully integrated triggering dependent on host capability). • Sample mapping function allows full view of the sample area and rapid navigation – mosaic and image import capability or suitable as per system requirement. • 8 or more laser ablation methods: single or multiple point, straight and segmented lines, area scan or raster and depth profiling, multi-line area scan and high-resolution raster. • High resolution image and video capture of ablations using onboard software. • Automated video zoom and sample motion control. • Software controlled Z-stage stepping for precise depth profiling. • Software for remote handling and online servicing/remote diagnostic of the instrument is also required. Support to be provided from WIHG



	<p>side such as internet, telephone and specific cable etc. should be mentioned clearly.</p> <ul style="list-style-type: none"> • Real time control of Z-stage focus, energy attenuation, laser shot frequency, and helium flow rate for quick and easy LA-ICP-MS optimization. The system software should provide facility for single point, multi-point, line scan, area scan, depth profiling etc. • One additional PC for offline processing of the data with compatible 'Glitter' software (full latest version) should be offered.
3.	<p>Additional Consumables:</p> <ul style="list-style-type: none"> • FLASH LAMP (01 set), INTERNAL TUBING KIT (02 Set), PINCH VALVE TUBING (02 Set), SAMPLE OUTPUT KIT (02 Set), CELL WINDOW-100mm, SERVICE KIT – SAMPLE CHAMBER (02 Set).

Requirement of Standard/Reference materials:

Reference mineral/ore/rock standards, multi elemental solution as mentioned below should be quoted with the instrument.

- **Reference/standard materials (whole rock)**

Sl.	Description
1	PCC-1 : Peridotite - USGS
2	DTS-1 : Dunite - USGS
3	GSP-1 : Peridotite - USGS
4	MAG-1 : Marine mud - USGS
5	SGRI-1: Green River Shale - USGS
6	BHVO-1: Hawaiian Basalt - USGS
7	SCO-1: Cody shale - USGS
8	KH : Limestone - ZGI (Zentrales Geologisches Institut, Berlin, Germany)
9	GPOS-301 : Dolomitic Limestone – RIAP (Research Institute of Applied Physics, Irkutsk, Russia)

- **Platinum group elements (PGE) standard (whole rock)**

Sl.	Description
1	WMG-1 -- CANMET (Canada)
2	WGB-1 -- CANMET (Canada)
3	WMS-1 -- CANMET (Canada)
4	SARM-7 -- South Africa
5	PTC-1 -- China

- **USGS Microanalytical Reference Materials**

Sl.	Description
1	BCR-2G: Basalt Glass (Epoxy Mount, Melted BCR-2)
2	BHVO-2G: Basalt Glass (Epoxy Mount, Melted BHVO-2)

3	BIR-1G: Basalt Glass (Epoxy Mount, Melted BIR-1)
4	NKT-1G: Nephelinite Glass (Epoxy Mount, Melted NKT-1)
5	TB-1G: Basalt Glass (Epoxy Mount, Melted TB-1)
6	GSC-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 3 ppm)
7	GSD-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 30 ppm)
8	GSE-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 300 ppm)
9	MASS-1: Synthetic Polymetal Sulfide (Pressed Pellet, in 19 mm ring)
10	MACS-3: Synthetic Calcium Carbonate (Pressed Pellet, in 19 mm ring)

• **NIST Glass standards**

Sl.No. Description

610	Trace elementss in glass – 4 wafers –
611	Trace elementss in glass – 4 wafers –
612	Trace elementss in glass – 4 wafers –
614	Trace elementss in glass – 4 wafers –
1640A	Trace elementss in natural water – 250 ml
1643E	Trace elements in water
615	Trace elementss in glass – 4 wafers –
616	Trace elementss in glass – 4 wafers –
2702	Inorganic in marine sediment

• **MERCK (solution)**

Sl. Description

1	Multi element standard solution – OC314979
2	Multi element standard solution – HC626403

• **Others Reference Material (minimum 200 grains or 0.5 gm as per availability)**

Reference material	Rock type/mineral
TNT666	Titanite
TNT150	Titanite
(Fe, Ni) _{1-x} S	Sulfide
(Fe, Cu) _{1-x} S	Sulfide
CPX666	Clinopyroxene
CPX777	Clinopyroxene
NBS-30	Biotite
Mica-Fe	Biotite
FK-N	Feldspar
UB-N	Serpentine
BCR-2G	Olivine
BIR-1G	Olivine
BHVO-2G	Orthopyroxene
SRM 99	Plagioclase
SRM 99a	Plagioclase
Sy	Rutile
R10	Rutile
91500	Zircon
Timora -2	Zircon
Mud Tank	Zircon
Pelsovice	Zircon
FC-1	Zircon
Trebilcock, Maine	Monazite
44069	Monazite
Amf-1	Amphibole



Additional requirements

Generals Terms

- The technical specification given above are minimum indicative only for ease of operation, maintenance, use of latest technology with proven advantage and excellent after sale service facilities are important factors in evaluation process.
- The TQ-ICPMS main instrument and the Laser Ablation system MUST be fully compatible for optimum quality of results, which should be demonstrated in the installation.
- Names and full credentials and experience of the factory trained service engineer currently on role in India for LA and TQ-ICPMS and place of normal residency must be submitted with the offered quotation. Please also mention by name how many of them have received training on the quoted model. In absence of this document it will be presume that there is no after sales, service, backup provided.
- Full service manual with complete circuit diagram and circuit descriptions to be supplied both as hard copy and CD along with diagnostic tools.
- Vendor/supplier must provide authentic technical documents, application notes, and research article as proof of all their claims and all those documents should be available in website also.
- Following application must be performed before users during installation of this quoted machine. Installation will be confirmed after development of these following protocols with good figure of merit which can be publiciable in reputed journals (please enclose some application notes for these applications).
 - Trace and REE measurement for liquid as well as solid geological samples.
 - PGE measurement for liquid geological samples.
 - U-Pb dating of monazite, rutile and zircon in solid mode for geological samples.

Pre-Installation requisites

- Comprehensive guidelines for the development of the pre-installation infrastructure including requirement of UPS, AC, transformer etc. with their specification. It will be the responsibility of the vendor to insure that the all necessary essential accessories and ancillary items are quoted for carrying out the standardization, optimization and calibration for objective applications including standard, chemicals, gases and consumables.
- The supplied system should be complete in all aspects to take the sample analyses at WIHG premises.
- The institute shall provide none other than three phase electricity line and appropriate laboratory ambience.

Installation and Acceptance Testing

- Installation and acceptance testing requirements should be explicitly mentioned along with the technical bid/ specification.



Reference:

- Company must have experience of supplying & supporting minimum Triple quadrupole ICP in India & minimum 03 TQ-ICP-MS with LA globally for similar or equivalent configurations for Geological applications with contact details (email, address, mobile) of the persons In-charge of the instrument, its model and date of installation. User list and other documents must be enclosed alongwith compliance statement. Vendor must provide all published documents as supporting.

Compliance Statement of Triple Quadrupole Inductively Coupled Plasma Mass Spectrometer (TQ-ICP-MS) with Laser Ablation (LA) System

Preamble:

Wadia Institute of Himalayan Geology, Dehradun, a premier research institution carrying out research in the field of Himalayan Geology invites sealed tenders for the procurement and commissioning of a high-Resolution Inductive Coupled Plasma Mass Spectrometer along with Laser Ablation Microprobe (LAM) on turnkey basis to obtain high-quality results on both liquid and solid mode, as per the key specifications given below.

Our analytical needs are:

- In solution analyses of all major and trace elements (2 to 260 or more amu) abundances, rare earth elements (REEs) and platinum group of elements (PGE) in geological and environmental samples/materials with detection limits down to ppt level.
- In-situ analyses of major and trace elements (2-260 or more amu), rare earth elements in minerals, natural materials, glasses, ceramics, metals, alloys, etc. with detection limits down to parts per trillion (ppt) level using Laser Ablation Microprobe.
- Provision for in-situ U-Pb isotopic analysis of various minerals like monazite, rutile, baddeleyite, zircon etc. using LAM in conjunction with TQ-ICP-MS.

(KEY SPECIFICATIONS)
TQ-ICP-MS

TQ-ICPMS: This system should consist two quadrupoles and one collision/reaction chamber		Compliance	Remarks
<u>Sample introduction system</u>	<p>The sample introduction should have easy change-over from one type to another (liquid mode to solid mode) including Laser Ablation interfacing.</p> <ul style="list-style-type: none"> • Standard sample introduction system must consist of HF/PFA Kit (nebulizer, peltier cooled spray chamber, torch, injector), cones (sample and skimmer cone (platinum)) & Tubing set. • The sample introduction system should have significantly low dead volume(quick washout) with option for low uptake rate(150 micro-L/min or lower) sample introduction. • The sample introduction system, torch , lenses and cones should be easily accessible for maintenance. • Additional two set complete HF/PFA resistant kit including inert nebulizer, PFA spray chamber, inert torch, inert injector, tubing set & cones set. • System should have the capability to handle concentrated solutions for direct aspiration (having high 25% TDS with direct aspiration) along with 		



	<p>fully automated & software controlled single accessories with 100-fold Argon gas or liquid dilution without utilizing manual Internal Standard Accessories. Published supporting documents must be enclosed.</p> <ul style="list-style-type: none"> • It should have computer controlled peristaltic pump with appropriate number of channels and rollers. • An auto-sampler with minimum 200 Vials, with complete enclosures of ducts and exhaust. Autosampler must have wellplate/microplate kit to analyze low volume samples i.e. 700-800μl. 1000 Nos. vessels should be included. • Four Mass Flow controller for plasma, Auxiliary, Nebulizer/sample and Makeup/Additional (Argon Dilution) gas must be offered • Online internal standard kit with splitter and tubing set. 		
B. Ion Source	<ul style="list-style-type: none"> • Icp source with solid state RF generator at ~27 MHz or better frequency band attached to a 3-4 turn load coil or suitable module with programmable RF power with power range 600 W to 1.6 kW or better with stepsize 10W. • The torch ignition shut down and system warm up should be auto-controlled with software • Torch position should allow for complete computer control and auto-tunable in x-y-z directions with independent movement or as per system requirement • Provision for auto alignment of the torch with reproducibility better than 0.1 mm or suitable in horizontal and vertical directions. 		
C. Vacuum System	<ul style="list-style-type: none"> • Suitable vacuum system with turbo and rotary pump. • There should be provision for automated vacuum reading at low and high vacuum ends of the mass spectrometers. 		
D. Ion-extraction interface	<ul style="list-style-type: none"> • System should have water cooled interface • Standard combination of nickel/ platinum sampler and skimmer cone for maximum sensitivity should be provided. Both cones should be easily mountable and demountable. • Cone interface : System must have single cone interface to analyze all kind of samples (i.e high matrix, high sensitivity ,low matrix, Boron matrix etc) ,without any manual intervention or hardware changeover to comply all guaranteed performance specification of system as per published data sheet (i.e. True liner dynamic 		

	Range, Detection Limits, Sensitivity, Oxide ratio, Abundance sensitivity etc)		
E. Collision and Reaction Cell	<ul style="list-style-type: none"> • The system should contain collision and reaction cell. • System should be capable of utilizing reactive gases as per requirement. • Three or more Gas lines along with Mass Flow Controller (MFC) for reaction gas to support various reaction gases in pure or premix form eg. H₂, NH₃, O₂, CH₄, C₂H₂, C₂H₆, N₂O, CO, CO₂, N₂ etc. • For collision helium Gas separate MFC should be offered. • Three or more Gas lines along with Mass Flow Controller (MFC) for reaction gas to support various reaction gases in pure or premix form Eg. H₂, NH₃, O₂, CH₄, C₂H₂, C₂H₆, N₂O, CO, CO₂, N₂ etc. 		
F. Mass Analyzer System	<ul style="list-style-type: none"> • It should consist of three quadrupoles in order to provide superior ion transmission, resolution and high abundance sensitivity. • The first quadrupole (Q1) before collision/reaction cell & third Quadrupole (Q3) after collision/reaction cell should have unit mass filtering capability as per IUPAC guidelines of triple quadrupole ICP-MS/MS system. • Mass range: 2-240 (or more) amu for Q1 & Q3 along with unit mass filtering capability. 		
G. Ion Detector assembly	<ul style="list-style-type: none"> • The ion detector should be a discrete dynode electron multiplier unit or equivalent. • Detector should be able to analyze high and low concentration simultaneously with 10 to 11 orders or better true linear dynamic range, not extended dynamic range (EDR) • Minimum dwell time: 100µSec in both pulse count and analog mode. • Both the analog and pulse counting modes should be protected against overload. • Working concentration range of the detectors should be from the detection limit to 1ppb & >1000 ppm without any adjustments of settings such as resolution, detector voltage etc. 		
H. Software	<ul style="list-style-type: none"> • Should provide compatible and user-friendly software for quantification. It should have templates for simultaneous report generation as soon as the analysis is completed. • The firm should provide software upgrades from time-to-time at least for five years after the installation. 		

	<ul style="list-style-type: none"> • Software should provide inbuilt methods for areas of our research interest in both solution and LA modes. 		
I. Performance Specifications:	<ul style="list-style-type: none"> • Please specify sensitivity (in Mcps/ppm or Kcps/ppb) for following elements along with printed proof/certified tested copies on the quoted models: Low mass: Li(7) – 65 or better Mid mass: Y(89) or In(115) - 300 or better High mass: Tl(205) or U(238) - 300 or better • Detection limit (in ppt) Be (9)- 0.5 or better In(115) - 0.1 or better U(238) or Bi(209) - 0.1 or better • Oxide Ratio: CeO⁺/Ce⁺ : < 2 % or better • Double charged ratio Ce⁺⁺/Ce⁺<4.0 • Background (cps) : 1cps or better (LM & HM) • Short term & Long-term stability (%RSD): < 3 • Isotope ration precision for ¹⁰⁷Ag/¹⁰⁹Ag (%RSD): <0.2 • Abundance Sensitivity: 5×10⁻⁹ or 0.005ppm or better (LM & HM) • Scanning speed: 3700 amu/sec or better 		
J. Computer system and UPS:	<ul style="list-style-type: none"> • Original Equipment Manufacturer (OEM) configured suitable PC with dual monitor (24") and latest model laser color printer must be offered which is compatible with the operation of machine. • 30 KVA UPS with 1 Hour backup from the reputed brands/ manufacturers with one hour back up time with power output quality as per requirement of the instrument. 		
K. Other Items for Installation.	<p>System should be supplied with</p> <ul style="list-style-type: none"> • NIST calibration multi-element standards 22/23 elements (10ppm; 250 ml) & NIST multi-element calibration standards 22/23 elements including 1000 ppm, 250 ml) • Single element (100 or 10ppm, 125 ml) for Hg & Au. • REE Multi elemental standard mix (17-18 element including U & Th) (250 ml) 100 µg/L (ppb) • 100µg/ml precious metals multi-element (Au, Pd, Rh, Ir, Pt, Ru) 250 ml • 100µg/ml Osmium standards for ICP-MS -200ml • Internal standard mix (5 element & 500ml) • Gas cylinders with regulators: Argon - 04 Nos., Helium - 02 Nos., Reaction gas NH₃, Hydrogen, Oxygen- (01 set each), Nitrogen Gas cylinder 01 		

	<p>set. Gas Panel as per requirement. Manifold with four-cylinder capacity for Argon.</p> <ul style="list-style-type: none"> • 10mtr Suitable exhaust fume hood assembly for ICP-MS & Auto sampler • Compact and low-noise chiller unit. • Auto-tuning standards for system check and wavelength calibration. 		
L. Other Items for Installation.	<p>System should be supplied with</p> <ul style="list-style-type: none"> • NIST calibration multi-element standards 22/23 elements (10ppm; 250 ml) & NIST multi-element calibration standards 22/23 elements including 1000 ppm, 250 ml) • Single element (100 or 10ppm, 125 ml) for Hg & Au. • REE Multi elemental standard mix (17-18 element including U & Th) (250 ml) 100 µg/L (ppb) • 100µg/ml precocious metals multi-element (Au, Pd, Rh, Ir, Pt, Ru) 250 ml • 100µg/ml Osmium standards for ICP-MS -200ml • Internal standard mix (5 element & 500ml) • Gas cylinders with regulators: Argon - 04 Nos., Helium - 02 Nos., Reaction gas NH₃, Hydrogen, Oxygen- (01 set each), Nitrogen Gas cylinder 01 set. Gas Panel as per requirement. Manifold with four-cylinder capacity for Argon. • 10mtr Suitable exhaust fume hood assembly for ICP-MS & Auto sampler • Compact and low-noise chiller unit. • Auto-tuning standards for system check and wavelength calibration. 		
M. ICPMS Consumable (for three years use approx.)	<ul style="list-style-type: none"> • Pt sampler, skimmer cone set (05 sets) • Standard injector and torch – 03 Nos. • Standard spray chamber & standard Nebulizer - 04 Set • Complete HF/PFA inert kit along with PFA Spray chamber, inert nebulizer, Inert torch with injector & pk/12 tubing's set (02 Set) • Standard peristaltic pump tubing for drain (pk/12) – 4 set. • Standard Peristaltic pump tubing for samples (pk/12) – 4 set • Peristaltic pump tubing for ISTD (pk/12) – 2Nos. • Tubing autosampler to peristaltic pump – 6 Nos. • Tubing for spray chamber drain (4.0mm , 2.5m)- 05 sets • PFA sample tubing, 0.5mm id, 1.6mm, 5 m- 08 Sets. • PTFE tubing for internal reaction cell gas, 1/pk (02 set) • Carrier/Make-up/Dilution gas tubing (02 each) • Sample tubing for nebulizer, 0.5mm, 10/pk 		

A

	<ul style="list-style-type: none"> • Graphite gasket for Sampling cone (3/pk) -03 set • Oil element/mist filter - 01 sets • Skimmer base for Nickle and Platinum cone (one set each) • Pump oil (1L) - 10 sets • RF coil - 01 set • Screw, spacer and O-ring for cell - 01 sets • Fluid for chiller – 06 L • Cone cleaning solvent /chemical - 04 L • Swab (cotton-tipped both ends) - 200 Nos. • Alumina Powder 100 gm - 02 sets • Autosampler complete tubing set - 01 sets • Autosampler vessels pk/1000 		
<u>LASER ABLATION (LA) SYSTEM</u>			
A laser ablation system should be fully compatible with TQ-ICPMS (above quoted) to obtain high end results on solid mode			
1. Specifications:	<ul style="list-style-type: none"> • Laser - Nd:YAG (UV-213nm). • Attenuator: software controlled Wavelength: 213nm flat beam. • Pulse length: <5ns • Pulse rate/repetition rate: 1-20 Hz or more. • Pulse Energy > 4 mJ/pulse source energy (high density homogenized beam) from the laser head with flat top energy profile. • Laser output energy is adjustable from 0 to 100% • Laser Spot size at sample: 5 micron or smaller to 200 micron or larger. • Spot selection: should be calibrated and computer controlled. • Energy stability: 3% or better. • Controls: programmable with manual override or suitable. • Attenuator: programmable with manual override joysticks or suitable • Apertures 14 selections (12 circular (with 5, 8, 10, 15 20, 25,30, 35 ,40, 50, etc) and 2 square). 		
Optics:	<ul style="list-style-type: none"> • Zoom video microscope system. • Magnification- selectable variable optical zoom (specify range and steps) • Computer controlled, continuously adjustable parfocal video microscope (2.6x – 32.5x optical zoom range) • Camera- color CCD/CMOS capable of resolving sample features down to a few microns in diameter. • Lighting- software controlled reflected,transmitted and ring light with focusing optics. High intensity LED lighting arrays. • Aperture: Motorized, preferred software control. • Alignment tools: cross hair, pin holes. • Polarizer: Motorized computer-controlled 		

		polarizer.		
Mechanical:		<ul style="list-style-type: none"> • Stage: 100mm x 100mm XY translation stage • Sample chamber: Two-inch diameter ablation cell with removable quartz window. • Aerosol transfer line: should be rigid straight piece from cup to external connection with no bend which can change bend radius with stage translation • Fast washout 2-volume HelEx II cell must also be quoted. • System should have possibility to upgrade in future for specialized sample cells i.e. Frame Laminar Flow cell, Spring Document Cell and Large Format Cell. • Purging: sample chamber should have proper gas purging arrangement. • Stage: should have software-controlled X, Y and Z movement with micron level resolution. Sample map navigation, depth profiles. • Viewing window: sample chamber should have a direct view window. • Sample introduction into plasma: Mass flow controller for carrying ablated material into the ICP- MS. 		
2. Computer and Software:		<ul style="list-style-type: none"> • Compatible PC with updated Windows OS(latest version) compatible to 213 Nm Nd-YAG laser ablation system.. • On screen display of safety interlocks and laser status. • Synchronized ablation control with host ICP-MS (universal external trigger as standard, fully integrated triggering dependent on host capability). • Sample mapping function allows full view of the sample area and rapid navigation – mosaic and image import capability or suitable as per system requirement. • 8 or more laser ablation methods: single or multiple point, straight and segmented lines, area scan or raster and depth profiling, multi-line area scan and high-resolution raster. • High resolution image and video capture of ablations using onboard software. • Automated video zoom and sample motion control. • Software controlled Z-stage stepping for precise depth profiling. • Software for remote handling and online servicing/remote diagnostic of the instrument is also required. Support to be provided from WIHG side such as internet, telephone and specific cable 		

	<p>etc. should be mentioned clearly.</p> <ul style="list-style-type: none"> • Real time control of Z-stage focus, energy attenuation, laser shot frequency, and helium flow rate for quick and easy LA-ICP-MS optimization. The system software should provide facility for single point, multi-point, line scan, area scan, depth profiling etc. • One additional PC for offline processing of the data with compatible 'Glitter' software (full latest version) should be offered. 		
3.	<p>Additional Consumables:</p> <ul style="list-style-type: none"> • FLASH LAMP (01 set), INTERNAL TUBING KIT (02 Set), PINCH VALVE TUBING (02 Set), SAMPLE OUTPUT KIT (02 Set), CELL WINDOW-100mm, SERVICE KIT – SAMPLE CHAMBER (02 Set). 		

Requirement of Standard/Reference materials:

Reference mineral/ore/rock standards, multi elemental solution as mentioned below should be quoted with the instrument.

• **Reference/standard materials (whole rock)**

Sl.	Description
1	PCC-1 : Peridotite - USGS
2	DTS-1 : Dunite - USGS
3	GSP-1 : Peridotite - USGS
4	MAG-1 : Marine mud - USGS
5	SGRI-1: Green River Shale - USGS
6	BHVO-1: Hawaiian Basalt - USGS
7	SCO-1: Cody shale - USGS
8	KH : Limestone - ZGI (Zentrales Geologisches Institut, Berlin, Germany)
9	GPOS-301 : Dolomitic Limestone – RIAP (Research Institute of Applied Physics, Irkutsk, Russia)

• **Platinum group elements (PGE) standard (whole rock)**

Sl.	Description
1	WMG-1 -- CANMET (Canada)
2	WGB-1 -- CANMET (Canada)
3	WMS-1 -- CANMET (Canada)
4	SARM-7 -- South Africa
5	PTC-1 -- China

• **USGS Microanalytical Reference Materials**

Sl.	Description
1	BCR-2G: Basalt Glass (Epoxy Mount, Melted BCR-2)
2	BHVO-2G: Basalt Glass (Epoxy Mount, Melted BHVO-2)
3	BIR-1G: Basalt Glass (Epoxy Mount, Melted BIR-1)

- 4 NKT-1G: Nephelinite Glass (Epoxy Mount, Melted NKT-1)
- 5 TB-1G: Basalt Glass (Epoxy Mount, Melted TB-1)
- 6 GSC-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 3 ppm)
- 7 GSD-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 30 ppm)
- 8 GSE-1G: Synthetic Basalt Glass (Epoxy Mount, Traces ~ 300 ppm)
- 9 MASS-1: Synthetic Polymetal Sulfide (Pressed Pellet, in 19 mm ring)
- 10 MACS-3: Synthetic Calcium Carbonate (Pressed Pellet, in 19 mm ring)

• **NIST Glass standards**

Sl.No. Description

- 610-Trace elementss in glass – 4 wafers –
- 611-Trace elementss in glass – 4 wafers –
- 612-Trace elementss in glass – 4 wafers –
- 614-Trace elementss in glass – 4 wafers –
- 1640A-Trace elementss in natural water – 250 ml
- 1643E – Trace elements in water
- 615-Trace elementss in glass – 4 wafers –
- 616-Trace elementss in glass – 4 wafers –
- 2702 – Inorganic in marine sediment

• **MERCK (solution)**

Sl. Description

- 1 Multi element standard solution – OC314979
- 2 Multi element standard solution – HC626403

• **Others Reference Material (minimum 200 grains or 0.5 gm as per availability)**

Reference material	Rock type/mineral
TNT666	Titanite
TNT150	Titanite
(Fe, Ni) _{1-x} S	Sulfide
(Fe, Cu) _{1-x} S	Sulfide
CPX666	Clinopyroxene
CPX777	Clinopyroxene
NBS-30	Biotite
Mica-Fe	Biotite
FK-N	Feldspar
UB-N	Serpentine
BCR-2G	Olivine
BIR-1G	Olivine
BHVO-2G	Orthopyroxene
SRM 99	Plagioclase
SRM 99a	Plagioclase
Sy	Rutile
R10	Rutile
91500	Zircon
Timora -2	Zircon
Mud Tank	Zircon
Pelsovice	Zircon
FC-1	Zircon
Trebilcock, Maine	Monazite
44069	Monazite
Amf-1	Amphibole

Additional requirements

Generals Terms

- The technical specification given above are minimum indicative only for ease of operation, maintenance, use of latest technology with proven advantage and excellent after sale service facilities are important factors in evaluation process.
- The TQ-ICPMS main instrument and the Laser Ablation system MUST be fully compatible for optimum quality of results, which should be demonstrated in the installation.
- Names and full credentials and experience of the factory trained service engineer currently on role in India for LA and TQ-ICPMS and place of normal residency must be submitted with the offered quotation. Please also mention by name how many of them have received training on the quoted model. In absence of this document it will be presume that there is no after sales, service, backup provided.
- Full service manual with complete circuit diagram and circuit descriptions to be supplied both as hard copy and CD along with diagnostic tools.
- Vendor/supplier must provide authentic technical documents, application notes, and research article as proof of all their claims and all those documents should be available in website also.
- Following application must be performed before users during installation of this quoted machine. Installation will be confirmed after development of these following protocols with good figure of merit which can be publiciable in reputed journals (please enclose some application notes for these applications).
 - Trace and REE measurement for liquid as well as solid geological samples.
 - PGE measurement for liquid geological samples.
 - U-Pb dating of monazite, rutile and zircon in solid mode for geological samples.

Pre-Installation requisites

- Comprehensive guidelines for the development of the pre-installation infrastructure including requirement of UPS, AC, transformer etc. with their specification. It will be the responsibility of the vendor to insure that the all necessary essential accessories and ancillary items are quoted for carrying out the standardization, optimization and calibration for objective applications including standard, chemicals, gases and consumables.
- The supplied system should be complete in all aspects to take the sample analyses at WIHG premises.
- The institute shall provide none other than three phase electricity line and appropriate laboratory ambience.

Installation and Acceptance Testing

- Installation and acceptance testing requirements should be explicitly mentioned along with the technical bid/ specification.

Reference:

- Company must have experience of supplying & supporting minimum Triple quadrupole ICP in India & minimum 03 TQ-ICP-MS with LA globally for similar or equivalent configurations for Geological applications with contact details (email, address, mobile) of the persons In-charge of the instrument, its model and date of installation. User list and other documents must be enclosed alongwith compliance statement. Vendor must provide all published documents as supporting.