

**Tender Notification for the procurement of "Accessory for Sample Preparation for Titan and 3D Atom Probe Instrument – Dual beam (FIB - FESEM) system" at AFMM (Last Date for submission of tenders: 6 December 2019)**

Dear Sir/Madam,

Kindly send your best quotation for the following item on C.I.P. Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, E.D., payment terms etc. The tenders should be submitted in two separate sealed envelopes - one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 1700 hours 6 December 2019.

Please enclose a compliance certificate along with the technical bid.

**Specifications of the product:**

**Item:** A dual beam system comprising of FIB-FESEM (Focused ion beam + Field Emission Scanning microscope) capable of performing TEM lamella preparation. The detailed technical specification of the equipment should be as follows:

Technical Specifications

Item	Requirement	Indicate compliance	Provide information	Provide	Post-installation acceptance criterion
<b>Electron Column</b>					
Electron beam source	Schottky field emitter	X			
Electron beam Voltage range	350V or less- 30kV or more	X	Step size		
Electron beam Current range	1 pA or less to 100nA or more	X	Continuous/ stepped Step size		
Electron beam Landing voltage	50 V or less to 30 kV or more	X	Methodology for deceleration		
Magnification	800000 x or more	X			
Resolution	At dual beam coincidence point At accelerating voltage of 30/20 kV 15 kV 1 kV  At minimum landing voltage and dual beam coincidence point Accelerating voltage of 30/20 kV 15 kV 1 kV  Best achievable resolution at accelerating voltage of 30/20 keV 15 keV 1 keV better than 1.5 nm at all keV	X	Provide information about (i) image formats (ii) Statesample used  Provide information  State working distance and all operational parameters, such as aperture size etc, probe current, probe size  state for immersion lens if and non immersion lens if applicable  state detector configuration		Post installation acceptance with comparable images
Electron Beam probe size			Probe size vs probe current  Continuous or stepped  Step size		
Electron beam current stability			Provide information		
Magnetic samples	Strategies for magnetic field free imaging		Describe for information		
Apertures, aperture sizes and insertion and retraction methods			Provide information		

Image acquisition system:	Image acquisition size Bit depth Electronic image shift Dynamic focus for stage tilt		Provide information		
Scan features	Point and line scan Focus window Image rotation, shift Tilt compensation Scan speed	X	Provide description  Range, stepped or continuous		
Field of View	Maximum without distortion		State operation parameters		
<b>ION COLUMN</b>					
Ion source	Gal liquid metal ion source Source life 1000 $\mu$ amp hour and above	X			
Ion beam voltage	500 V or less to 30 kV or more	X	Stepped or continuous State step size if applicable		
Ion beam current	1 pA or less to 30 nA or more	X	Stepped or continuous State step size if applicable		
Probe size			Provide minimum probe size Provide probe size vs current data		
Ion beam profile	Circularity is important Significant deviation from circularity will be cause for disqualification	X		Provide TIFF images at combinations of high and low probe currents and sizes on a standard Si sample	Demonstrates similarity after installation
Ion beam milling rate	for Si $\geq 0.25 \mu\text{m}^3/\text{nC}$	X	State operational parameters		
SEM-FIB angle			For information		
Magnification			For information		
Working distance at dual beam coincidence point			For information		
Ion beam apertures			Indicates sizes, movement and centering methodology		

Spatial resolution	At dual beam coincident point At accelerating voltages of 30 kV 5 nm or less		Indicate all operating conditions such as current, probe size, working distance, standard sample	Provide TIFF images on standard samples	Demonstrate conformance on site after installation
Ion beam image acquisition size and performance	Image size and bit depth: Image shift:		Provide information		
Beam control	rotating the ion beam raster in a 360 degree continuous fashion, and shall have a function to reset this rotation to 0 degrees.  capable of reduced-raster, spot-mode, and line-scan ion-imaging modes	X			
<b>IMAGING DETECTORS FOR ELECTRON AND ION BEAM COMUMNS</b>					
In column/lens detectors SE and BSE		X			
BSE detector		X			
In chamber IR camera		X			
Probe current measurement		X			
<b>TEM AND ATOM PROBE SAMPLE PREPARATION</b>					
Requirements	In situ micromanipulator for transmission electron microscopy (TEM) and atom probe tip samples under computer control without operator intervention.  Pneumatic insertion and retraction	X			Demonstrate after installation
Probe performance	In situ manipulator with 4 degrees of freedom	X			Demonstrate after installation
	Drift, vibration, repeatability		Provide information		Demonstrate after installation

GAS INJECTION SYSTEM					
Requirements	Agas injection systemwithmorethantwo injectionmodulesenablingbeaminduced Ptand Au deposition	X			
Stage	<p>Astagerwithmotorizedaxes withadequate degreesof freedomrequiredfor the accuratepositioning of theneedlein the workingarea.</p> <p>Automated nozzlepositioning andangle</p> <p>Injectionlinemustallowprecisecontrol over gasflow, and heating of individual lines</p> <p>Thestagemustbecapable of depositing finelyspaced nanosizeddepositsin arrays atspacingsof atleast¼micron.</p>	X	Providedetailed description		Demonstrateafter installation
Precursors	Standardreservoir for PtandAu	X			

SAMPLE STAGE AND HOLDER REQUIREMENTS					
Main chamber size			Provide information		
Maximum sample size	Taking into account use of electron and ion column (at coincident point) and all necessary tilt angles for EBSD/EDX/ion milling and other detector restrictions		Provide information		
Stage performance	Piezo driven stage movement compucentric rotation where stage rotation is accompanied by X and Y translation to maintain the same sample field of view during stage rotation.	X	Provide information on sample movement and rotation limits		
Holders	<b>Standard holders</b> Specialized holders with precise pretilt angles suitable for imaging with BDSE/SE without sample movement are required.  The vendor will indicate the accuracy of and precision of such stage movements to enable precise return without backlash to original positions	X	Provide information on maximum / minimum sample dimensions, shape restrictions and weight restrictions for each holder		
INTEGRATED PLASMA CLEANER AND CRYO-CLEANER FOR CLEANING THE SAMPLE SURFACE AND CHAMBER WALLS		X			

VACUUMSYSTEM					
System description			Provide completed description of system in response		
System requirements	<p>oil free system electron gun, accelerator region and any differential pumping chambers shall be continuously evacuated by ion pumps</p> <p>column components and chambers below the electron gun and ion gun will be evacuated by turbomolecular pumps or equivalent oil-free system.</p> <p>mechanical pumps used to achieve rough vacuum levels will prevent back-streaming of oil into the vacuum system</p>	X			
	Chamber vacuum		Provide information		
	Gun Vacuum		Provide information		
	FIB gun vacuum		Provide information		
	Pumping rate of main chamber		Provide information		
Sample loading and unloading	Loadlock for specimen exchange				
<b>SUPPORTING SOFTWARES</b>					

Ion Beams support Data	Files containing Ga beametchrates for most standard metals and alloys (viz., Fe, Ti, Ni, Cr, Si, Al, Steel, SiN, SiC etc.) must be present in the system	X			
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Software supporting Stageholder movements for automated functions		X			
Software supporting detector configurations that enhance analysis of SE, BSE and Ion Images		X			
free/w/ upgrades for 10 years after equipment installation and acceptance		X			
functional details of each software package			Provide information		
<b>AUXILIARY EQUIPMENT</b>					
UPS requirements for stable, power shut-down free equipment operation will be provided in supplier response. ISS will procure such auxiliary equipment to specifications provided by the supplier		X			
The supplier will provide any auxiliary cooling required for equipment cooling such as water chillers and costs such equipment in its response		X			
<b>SITE PREPARATION REQUIREMENTS</b>					
The chosen supplier shall indicate all site requirements including those for stable equipment operation within one week of order placement		X			



The chosen supplier shall construct an initial site survey immediately after order placement and provide written preliminary assessment of site suitability. The supplier will provide a written declaration of site suitability in all aspects before equipment installation of equipment		X			
It is the responsibility of IISc to ensure that the site meets with all specifications of the supplier in time for equipment installation					
<b>SPARES'</b>					
Spare FEG source		X			
Long-life Gas source		X			
Spare stubs – 100 nos		X			
70 deg pre-tilt holders (4 nos.)		X			
Load lock with suitable holders (2 sets minimum) should be provided.		X			
Supplier will, indicate any additional spares required for one year trouble free operation		X			

**Terms and conditions**

1. Two bid system (separate technical and financial bids) in sealed tenders
2. Technical bid and price bids to be sent within three weeks of receipt of tender.
3. The technical bid must follow the prescribed format given below. It should include the exact format of quotation in the price bid without including the prices. Vendors who include price information in the technical bids will be automatically disqualified.
4. Technical bids will be opened first. IISc may seek clarifications after opening of technical bids. Vendors may be required to give presentations. The technical specifications are provided as a table. The items for which conformance to specifications is required are indicated by a 'X' in the second column. There are several items that require information to be provided by the supplier. If information is not provided against any of these items, this will disqualify the supplier. After technical evaluation by a committee, vendors may be asked to re-quote in a specific format to facilitate comparison of prices. IISc also reserves the right to cancel the tender at any time without assigning any reason whatsoever.
5. Price bids of only technically qualified vendors will be considered and the vendors will be informed the day of opening the price bids.
6. The price bids must offer CIF Bangalore prices.
7. Prices to be quoted separately for baseline system and options. Prices will should be quoted in adequate detail with relation to packing details to cover insurance compensation in case of damage to any specific modules
8. Indicate separately price of spares listed above in terms of unit cost. The price of these spares will be included in the price comparison. Any additional spares recommended by the company will be considered for ordering but not included in the comparison. The buyer reserves the right to make the final decision on ordered spares
9. Indicate price for annual maintenance contract.
10. The payment will be by letter of credit: payable 80% on shipping, 20% after satisfactory installation and acceptance.
11. Indicate Delivery period
12. Order will be placed on lowest bid from technically qualified vendor
13. Additional terms and conditions are indicated below:

Training		<p><b>Essential</b> Suppliers shall provide comprehensive training on site on all details of use of instrument and associated software immediately following satisfactory installation. The costs shall be included in the cost of the basic equipment</p>
Warranty period		<p><b>Essential</b> 1. The Contractor shall provide, at a minimum, a 1 year warranty for the equipment. Warranty shall include all parts and labor. Warranty shall be on-site or return to Contractor as deemed necessary by the Contractor. If on-site, all travel costs shall be included in the warranty. If returned to Contractor, all shipping charges and all responsibility for the shipment to and from IISc shall be the responsibility of the contractor. The cost of the first year warranty shall be included in the cost of the basic equipment. 2. Warranty shall begin on the instrument and its components when</p>

		<p>all specifications are met and IIS accepts the instrument. Any components delivered and installed at a later date will have a 3-year warranty period beginning upon acceptance of the individual component. In addition, the warranty shall include, at no additional cost, two routine service visits during the warranty period to clean and make routine adjustments. The Contractor shall be responsible for warranty of the entire system, including ALL third party components.</p> <p><b>Optional</b>  3. For 2<sup>nd</sup> and 3<sup>rd</sup> year of warranty, vendor will quote the prices for service and parts separately, as separate line items in the price bid.</p>
Annual Maintenance Contract	Period of 2 years following expiry of warranty period	<b>Essential</b> , indicate terms and conditions. Vendor will quote the prices for service and parts separately, as separate line items in the price bid.
Equipment supplied in India	At least one piece of equipment of a similar nature, that is, with an identical electron beam column and ion beam column, and detector configurations, capable of performing all the functions listed in the specifications, should have been supplied, installed and currently operational in India.	<b>Essential</b> Indicate the institution and contact details for all equipment of the same type supplied in India.
Service	Trained service agent in India. Response time during warranty period less than 48 hours of problem reporting	<b>Essential</b> Indicate number and location of trained service agents in India.

**Please stick to the following format while responding to the tender:**

Item	Price	Remarks
<p>Dual Beam Baseline system</p> <p>Including</p> <ul style="list-style-type: none"> <li>• Ion column</li> <li>• Electron Beam Column</li> <li>• Standard detectors (ET, SE and BSE),</li> <li>• Retractable 4 quadrant BSE</li> <li>• In chamber IR camera</li> <li>• Standard Sample Holders</li> </ul> <p>(mention all standard detectors and sample holders)</p> <ul style="list-style-type: none"> <li>• Gas injection system</li> <li>• Cooling system</li> <li>• Load lock</li> <li>• All necessary supporting hardware and software including computers (provide software list), licenses and upgrades</li> <li>• All necessary standards for all calibration</li> </ul> <p>Inclusive of:</p> <ul style="list-style-type: none"> <li>• on-site training for baseline and optional systems</li> <li>• 1 year warranty with service and parts</li> <li>• all documentation</li> </ul>		<p>Will be included in price comparison</p>

In-situ micromanipulatorforTEM/AtomProbesamplepreparation		Willbe includedin pricecomparison
Optionaldetectors <ul style="list-style-type: none"> <li>• Ion</li> <li>• Probecurrent measurement</li> </ul>		Willbe includedinpricecomparison
Integratedplasma cleaner		Willbe includedinpricecomparison
Cryo-cooler		Willbe includedinpricecomparison
Spares <ul style="list-style-type: none"> <li>• Indicated</li> <li>• optional</li> </ul>		Willbe includedinpricecomparison
AdditionalLoad locksetup		Will notbe includedin price comparison
TOTAL CIF Bangalore		
Extendedwarrantee:2additionalyears <ul style="list-style-type: none"> <li>• withserviceandparts</li> <li>• withservice</li> </ul>		Will notbe includedin price comparison
PostWarrantyAnnualMaintenanceContract <ul style="list-style-type: none"> <li>• Withservice</li> <li>• Withpartsandservice</li> </ul>		Will notbe includedin price comparison

**Please send the quotation to the following address:**

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IndianInstituteofScience  
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Sl.No.	Description	Date/Time
1	Publishing/Uploading Tender Document to IISc website	15.11.2019
2	Last Date for Submission of Bids	06.12.2019, 5.00PM
3	Technical Bids Opening	09.12.2019, Forenoon
4	Commercial Bids Opening	09.12.2019, Afternoon