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भारतीय प्रौद्योगिकी संस्थान धारवाड  
Indian Institute of Technology Dharwad

## **EXPRESSION OF INTREST**

**No. IITDh/GA/CRF/2018-2019/03**

**EXPRESSION OF INTEREST (EoI) FOR PROCUREMENT  
of  
FIELD EMISSION SCANNING ELECTRON MICROSCOPE  
with EDS AS PER ANNEXURE-I**

## 1. Introduction

IIT Dharwad is an Institute of National Importance created by an Act of Parliament in 2016. IIT Dharwad has been steadily establishing its operations in its transit campus. Simultaneously, the institute is employing bright young and accomplished faculty. A number of unique research and development programs are on the anvil. The institute now needs to raise the levels of the capacity with the best of the facilities and infrastructure. This will provide highly talented and accomplished faculty to pursue not only their research but also think of innovative way of introducing instructional/teaching/learning solutions to practical problem of the students.

## 2. Objective

The objective of this invitation of Expression of Interest (EoI) is to seek responses from eligible Vendors for **SUPPLY, INSTALLATION, COMMISSIONING, DEMONSTRATION and TRAINING OF FIELD EMISSION SCANNING ELECTRON MICROSCOPE with EDS as per Annexure-I**

## 3. Timelines

3.1 Major activities in the procurement process will be as given below: -

SI No	Activity	Remarks
(a)	Pre-Bid Meeting	<ul style="list-style-type: none"><li>To clarify the issues/ queries raised by intrested firms facilitate submission of bids.</li></ul>
(b)	Deadline for submission of EoI	<ul style="list-style-type: none"><li>Till 10.00 Hrs on 03/10/2018</li></ul>
(b)	Issue of Tender Document	<ul style="list-style-type: none"><li>Only to the vendors who submit the response to the EoI. Link for downloading the tender document to such vendors will be sent via e-mail on 04/10/2018</li></ul>
(c)	Submission of Tender Documents	<ul style="list-style-type: none"><li>Deadline for bid submission 17/10/2018, 16.30 hrs based on updated specifications and tender document</li></ul>
(d)	Evaluation of Technical Bids	About 3 weeks (Tentative)
(e)	Opening of Commercial Bids	<ul style="list-style-type: none"><li>The shortlisted bidders will be intimated by e-mail the schedule of opening of the commercial bids</li></ul>
(f)	Award of Contract	<ul style="list-style-type: none"><li>The selected vendor will be awarded the contract.</li></ul>

#### 4. MATERIAL DESCRIPTION

**HIGH RESOLUTION FIELD EMISSION SCANNING ELECTRON MICROSCOPE with EDS as per specifications described below in Annexure-I**

##### 4.1

##### Annexure-I

##### Essential Specifications:

High resolution Thermal Schottky emitter FESEM with latest technology must have following minimum specifications:

1	Electron Gun	Field emission electron source Schottky FEG
2.	Resolution	With SE detector, 0.7 nm at 15KV or better without stage bias. Higher resolution would be given high preference
3.	Magnification	X50 to x20,00,000 or more referenced to polaroid image format
4.	Accelerating Voltage	20v to 30KV
5.	Probe Current	100na or more
6.	Column Shielding	MU metal shielding of the column for EMI protection; Suitable anti-vibration suspension system for column & chamber
7.	Sample Stage	Fully motorized compucentric stage
8.	Chamber size	300mm x 250mm or larger chamber with at least 10 accessory port for future expansion; Should be able to house sample having maximum width of 100 mm or more and height of 50 mm or more
9.	Stage	5 axis Mechanically Eccentric motorized stage movements equivalent to or better. X=130mm Y=130 mm Z=50mm Tilt= -3° to 50° or wider range of tilting Rotation =360° Should have image navigation capability
10.	Multi-Specimen Holder	7-9 position multi-specimen holder with inbuilt Faraday cup
11.	Detectors	a) Chamber mounted SE detector for SE2 detection. b) Annular In-Lens/upper Secondary electron detector for SE1 detection. c) 6 segment pneumatic retractable semiconductor type detector (4 segment and 2 annular semiconductor for collecting large angle and segmented signal) d) Energy selective Backscattered detector for detection of low loss BSE and to differentiate carbon & diamond. e) EDS should be capable of detecting element from Boron to

		uranium, capable of doing qualitative, quantitative elemental characterization and mapping. f) IR CCD camera for live chamber view
12.	Protection System	SE, BSE, EDS detectors should have a mechanism of protection from any kind of damage by contact with specimen or specimen stage
13.	EDS	The EDS detector should be liquid nitrogen free silicon drift detector (SDD) type having single SDD crystal area of at least 50 mm <sup>2</sup> or more. The EDS software should be capable of doing elemental analysis, spectral imaging & mapping, multi-elemental mapping, image co-related elemental analysis, line and multi-point analysis.
14.	Image resolution and storage formats	4096 x 3072 pixel or better. Capability to store images in BMP, TIFF, JPEG, GIF, PNG or PGM, PPM formats
15.	Depth	Up to 16 bits per channel or better
16.	Scanning Features	<ol style="list-style-type: none"> <li>1. Point &amp; Line Scan</li> <li>2. Image rotation</li> <li>3. Image shift</li> <li>4. Tilt compensation</li> <li>5. Dynamic focus for tilted surfaces in plane/folded plane</li> </ol>
17.	3D Imaging	3D imaging with facility for Live Stereo image storage in AVI format
18.	Fail-Safe High Vacuum System	<ol style="list-style-type: none"> <li>1. Suitable vacuum system having ion pump, turbo pump &amp; Oil free pre-vacuum pump.</li> <li>2. Should have different gauges for vacuum measurements.</li> <li>3. Exchange time for large sample should not take more than 5 minutes for specimen exchange (50mm height &amp; 150mm diameter).</li> <li>4. Pumping time less than 3 minutes</li> <li>5. Should support Specimen exchange for in-situ stages.</li> <li>6. Vibration isolation and mounting unit for keeping dry pump outside</li> <li>7. Automatic venting with dry nitrogen connection</li> <li>8. Ventilation interlock to protect windowless X-ray detector</li> </ol>
19.	Electron Optics/ Specimen Type	<ol style="list-style-type: none"> <li>1. Beam booster for high resolution imaging at low KV</li> <li>2. Technology should support simultaneous collection of SE &amp; BSE (low loss) from sample and should support all kind sample including non-conducting samples in Tilted condition</li> </ol>
20.	PC control and software	<ol style="list-style-type: none"> <li>1. High end 32/64-bit desktop for instrument control and data processing</li> <li>2. 24" TFT monitor or better for image display</li> <li>3. Standard software for image operations, measurements &amp; processing</li> <li>4. Network operation software for remote SEM operation and fault diagnosis using TCP/IP protocols</li> </ol>

		5. Manual Joystick control for stage axis.
21.	Others	Please specify additional technical features (if any) which is/are not covered in the above points but is/are part of the system
22.	UPS	Suitable UPS with 1 hour or more backup with PANASONIC Batteries
23.	Calibration and Manuals	<ol style="list-style-type: none"> <li>1. Standards for the calibration of magnifications, dimensions and resolution</li> <li>2. Two Set of detailed user instruction manual, operation/instruction manual, troubleshooting manual, CDROM Tutorials for FESEM and EDS in English</li> <li>3. Two sets of detailed circuit and fault diagnostic software, detailed circuit diagram of the equipment, maintenance and service manuals in English</li> </ol>
24.	Power requirement	As per Indian Electrical Standards
25.	Installation Accessories	<ol style="list-style-type: none"> <li>1. Chamber scope</li> <li>2. Chiller</li> <li>3. Compressor</li> <li>4. Interface between SEM and EDS</li> <li>5. Multipurpose Specimen holder for holding wide variety of samples.</li> <li>6. Required gas cylinders with gas regulators</li> <li>7. Carbon and Cu tape (roll)</li> <li>8. Mounting stubs (25 Nos)</li> </ol>
26.	Warranty and support	<ol style="list-style-type: none"> <li>1. 3 years comprehensive warranty (not including the down time) must be included</li> <li>2. Warranty should start from date of installation</li> <li>3. One re-shift and re-installation of the instrument should be provided (as the location of instrument might change from present campus to the permanent IIT Dharwad campus)</li> <li>4. 10 years after warranty support to the product and availability of the parts</li> <li>5. FESEM must have provision for on-line diagnosis of faults</li> <li>6. Trained FESEM operator supported by vendor for first 1 year</li> <li>7. Necessary on-site training must be provided free of cost</li> <li>8. Service response time must be 48 hours</li> </ol>
27.	Required documents along with technical specifications	<p>For the quoted equipment, the supplier must provide:</p> <ol style="list-style-type: none"> <li>1. List of at least 3 users in India, with exactly similar systems preferably installed in last 5 years</li> <li>2. The name(s) and contact details of service engineer(s) employed by them who is/are competent to service the equipment being quoted along with their locations in India</li> <li>3. The supplier should provide calibration/traceability certificate of the equipment as the National Institute of Standards and Technology (NIST)/ National Physical Laboratory (NPL)/ United Kingdom Accreditation System (UKAS) preferably</li> </ol>

## 4.1.1.

## Annexure-II

A metal sputter unit with the following specifications is also to be quoted with the FESEM

1.	<b>Automatic Sputter Coater</b>	
	Chamber size	<ol style="list-style-type: none"> <li>1. At least 100mm diameter</li> <li>2. At least 120 mm height</li> </ol>
	Sputter head	<ol style="list-style-type: none"> <li>1. Low voltage planar magnetron</li> <li>2. Quick target change</li> <li>3. Wrap-around dark-space shield</li> </ol>
	Sputter target (Disc style)	<ol style="list-style-type: none"> <li>1. Gold fitted as standard (Au/Pd or Pt optional)</li> <li>2. At least 50mm diameter x 0.1mm thick</li> </ol>
	Sputter supply	<ol style="list-style-type: none"> <li>1. Microprocessor based</li> <li>2. Safety interlocked</li> </ol>
	Sample table	Capable of holding at least 10 ½" FESEM stubs
	Metering	<ol style="list-style-type: none"> <li>1. Vacuum: Atm - 0.001mb</li> <li>2. Current: 0 - 50mA</li> </ol>
	Control method	<ol style="list-style-type: none"> <li>1. Automatic operation of gas purge and leak functions</li> <li>2. Automatic process sequencing</li> <li>3. Full manual override</li> <li>4. Digital timer, 5 - 300 seconds with pause</li> <li>5. Automatic vent</li> </ol>
	Thickness monitoring and control	Precise thickness monitoring system and optional termination facility
	Power	45 VA max (excluding rotary pump)
2.	<b>Pumping System</b>	
	Rotary Pump	High speed, direct drive 2-stage
	Pumping speed	<ol style="list-style-type: none"> <li>1. At least 5m<sup>3</sup>/hr</li> <li>2. Pumpdown time to 0.1mb should be not more than 25 sec.</li> </ol>
	Power	130 VA max
3.	<b>Services and other information</b>	
	Supply	230 VAC, 50/60Hz
	Power	175 VA max. including rotary pump
	Gases	<ol style="list-style-type: none"> <li>1. Argon sputtering process gas with minimum purity 99.9%. Nitrogen gas for venting (optional)</li> <li>2. Pressure, regulated 7 - 8 psi (0.5 - 0.6 bar)</li> <li>3. Hose connection, 6.0mm (¼")</li> </ol>

## **DETAILS OF PRE-BID MEETING**

To clarify the issues/queries raised by interested firms and to facilitate in submission of bids, the pre-bid meeting would be held as follows:

Place	Time	Date
Board Room, Admin Building, IIT Dharwad	14.00 hrs	04/10/2018

## **PROCEDURE FOR SUBMISSION OF RESPONSE TO THE EoI**

The response to the EoI should reach IIT Dharwad on or before 03/10/2018 by 10.00 hrs on the following address:

The Officer on Special Duty  
(Admin, Finance & Contracts)  
P.B. Road, Near High Court, Dharwad-580011

Or can be forwarded by e-mail at [pro@iitdh.ac.in](mailto:pro@iitdh.ac.in) on or before 03/10/2018 by 10.00 hrs.

For any queries, you may reach us at 0836-2212839

Please acknowledge the receipt of this invitation for EoI

Sd/-  
Officer on Special Duty  
(Admin, Finance & Contracts)  
IIT Dharwad