INSTITUTE OF PHYSICS
(An autonomous research Institute of Dept. of Atomic Energy)
P.O.-Sainik School, Bhubaneswar-751005, India

TENDER NOTICE NO. IOP/PUR/LAB/05-06/03

Last date of receipt of the sealed quotations: 06.01.2006 upto 3 P.M.

Item-wise sealed quotations are invited from manufacturers / authorised dealers for supply of the following laboratory items.

Sl.No.	Description	Qty
1	High resolution Field Emission Gun Scanning Electron Microscope(FEGSEM) based on Schottky emitter, suitable to work at high and low vacuum and with built in e-beam pattern generation facility. (Please see below for the detailed description.)	01 Set

Note:
The Institute is a non-profit educational & research organization for which special discount, if any, should be specially mentioned. For item No. 1 (as mentioned above)quotations should be submitted in sealed envelops in two parts separately, i.e. "Technical Bid" (Part-A) & "Financial Bid" (Part-B). Both the parts should be further sealed in an envelop superscribing the name of the item. For rest of the items quotations specifying rates, applicable taxes along with technical specification/ broachers and Terms & Conditions for supply should be sent in sealed envelope super scribing "Quotation for supply of _____(name of the item)" and address to the undersigned.

The authority of the Institute reserves the right to accept or reject any or all quotations either in full or in part without assigning any reason thereof.

DIRECTOR

A detailed list of specifications are given below.

Basic Specifications for FEGSEM:

1) High resolution Schottky FEG-SEM: low and high vacuum modes; useable for soft-matter (i.e., like polymers, LB films, or any charging or contaminating specimen) as well as other hard materials.
2) Resolution of 1.0 nm (or better) at 30 kV
3) In built pattern generation system; Probe size ~1.0 nm at 30 kV and with a probe current of ≥ 20 nA (this is for e-beam writing purpose);
4) High-resolution SE Detectors for both low vacuum and high vacuum modes
5) Air-cooled Water Chiller Unit
6) Air compressor
7) Optional: EDS and EBSED
8) Optional: Gas Chemistry solution and/or e-beam deposition
9) Optional: Accessories to do SEM measurements at atmospheric condition
10) Optional: STEM detector
11) Optional high and low temperature stages

(1) Electron Source and Optics:

(a) Schottky field emitter, preferably with ZrO/W emitter

(b) Resolution:

High and Low Vacuum modes: 2.4 nm or better at 1.0 kV

1.0 nm or better at 30 kV

(c) Accelerating voltage: 0.5 kV to 30 kV

(d) Image Rotation correction

(e) Beam Current: For high-resolution mode: up to 10 nA

For e-beam patterning and analytical mode: ≥ 20 nA

(f) Source Life time: minimum 1 year guaranteed

(g) Magnification: × 50 to × 500,000 (or better)

(2) Chamber:

Chamber to have enough ports for EDS, EBSED, e-beam deposition and other deposition schemes; Chamber should have about 7 – 8 ports at the minimum

(3) Vacuum system:

Oil free vacuum system

Gun system: better than 10^{-8} mbar

Specimen chamber: High vacuum mode → $\leq 10^{-5}$ mbar

Low vacuum mode → $\leq$ 1.0 mbar

(Optional) High-pressure mode → > 1000 mbar

Evacuation time: Less than 5 minutes (for high vacuum mode)

Gun – Chamber isolation: Built – in with Pneumatic drive and linked to Acceleration voltage ON/OFF switch.

Should be able to run in Un-attended mode to keep the vacuum in the Gun column.

Proper specimen exchange facility should be provided.

(4) Detectors:

SE detector (High Vacuum)

SE detector (Low Vacuum)

SE detector (High Pressure) (Optional)

EDS (Optional)

BSED (for High Vacuum, Low Vacuum) (Optional)

STEM (Optional)

(5) *Specimen Stage:*

Eucentric goniometer stage with 5-axis control

Translation: X, Y and Z-axis: ± 25 mm (total range of 50 mm) (or better)

(Motor driven: optional)

Tilt: - 5° to + 70° (or better) (motor driven: optional)

Rotation: 360° (continuous) (motor driven: optional)

Should provide the specimen holders for various shapes of samples.

Temperature control **(Optional):** - 120° C to 900° C

(There could be one cryo stage and one heating stage)

(6) e-beam writing (pattern) Processing:

Up to 4k×4k-pixel resolution for patterning (each pixel size < 1 nm)

Pattern generation and transfer software

Digital beam controller

Beam blanking with controls incorporated in the main system

Communication interface

Faraday cup

Pico meter to observe specimen absorbed current

Proximity Effect correction package

(7) Scanning/Display System

A high-end display system with 1280×1024 pixels displays a high-quality image under GUI (graphic user interface) on the Windows operating system. The scanning electron microscope operations, from setting observation-conditions to observing images, are performed through the Windows screen by operating a mouse, keyboard and controls on the operation panel.

Images needed to be configurable for single frame display or 4-quadrant display. Images needed to be viewed live, averaged or integrated. Images and saved in TIFF, BMP or JPEG file formats, and in 8-bit or 16-bit depth, to the hard disk or LAN from the graphical user interface. Image printing is also available from the user interface.

Liquid crystal display for image observation

Display panel: 18.1 inch

Number of pixels: 1,280×1,024

An integrated IR-CCD camera for in-chamber viewing is included.

(8) SEM control system:

Personal computer: IBM PC/AT compatible

RAM: 512 MB or more

OS: Windows XP

Various Windows functions: Filing, Editing, Help

User login functions: Login name secured with password

Image storing position

Image file format

Password

Recipe setting

Operation: GUI/mouse and controls on the operation panel

Keyboard (for entering alphanumeric inputs etc.)

Scan and display mode: Full frame scan

Reduced scan (1/2 frame size)

Field limiting scan (analysis): Line profile; Spot

Scan speed: Variable but able to select

Various Image modes to analyze the data quantitatively

LCD display: Image

Measurement functions: Distance in X, Y and diagonal direction

Angle of diagonal line

Annotation and text display: Symbols can be selected and pasted.

Alphanumeric entry from keyboard

Image processing functions: Sharpen; Smooth; Median; Gaussian

List of saved images: Observation conditions for the selected image

Lookup table (LUT) display: γ correction, binary coding, multiple-level coding, and histogram.

Gray-scale display: Possible

(9) Recording system

Image recording through the computer

Plat films (optional)

(10) Air Cooled Water Chiller

Should work at ambient temperatures (between 5 °C and 35 °C), with a variation of no more than 0.1 °C per minute. Depending on the ambient temperature, the cooling capacity goes up to 1125 W. It should be air-cooled.

Noise level: < 55 dBc.

Power requirements: 220 V / 50 Hz, 8 Amps; suitable for 220 V mains; permissible mains voltage variation: 10%; Single phase

(10) Terms and conditions:

(a) **Prices**

Prices need to be quoted for CIF Bhubaneswar.

(b) **Terms of Payment**

Mode or payment: Through an Irrevocable Letter of Credit for 100% value of the order

Payment terms: 90% against shipment and balance 10% after successful installation

Performance bank guarantee: Will be required

No partial shipment would be allowed.

(d) Delivery

Within 9 months after opening the LC

(e) Warranty

24 Months from the date of installation. Any replacement of spare parts will be on CIF Bhubaneswar basis. Your Services will also be available to us free of charge during this period.

(f) Predelivery-inspection and Training

Details to be given

(g) Customer Service

Details to be given

(h) Validity

Quotation should valid up to 90 days from the starting date

(i) Countries of Origin

Should be provide