

# INDIAN INSTITUTE OF TECHNOLOGY DELHI HAUZ KHAS NEW DELHI

Date: 21<sup>st</sup> September, 2011

## Notice Inviting Quotation

Quotations are invited for the purchase of a **Cryo-transmission electron microscope** for the Kusuma School of Biological Sciences. Interested suppliers are required to submit their quotations as per the specifications given below. The sealed Quotations are to be submitted in two Separate envelopes;

**A - for Technical Quote (Specifications) &  
B - for Financial Quote  
(For details see Annexure I)**

Both these envelopes should be enclosed in an outer envelope, which should also be sealed and addressed, clearly mentioning on top right corner of the envelope "**Quotation for Cryo-Transmission Electron microscope**" due on **19th October, 2011**.

The quotations should reach the office of **Dr. Manidipa Banerjee, Room No. 308, Kusuma School of Biological Sciences, by 10.00 AM on 19th October, 2011**. If needed, the suppliers may be asked to make a technical presentation before the committee.

Institute reserves the right to accept or reject any of the offers without assigning any reasons.

## Technical Specifications

### A. Microscope

Electron source	Schottky field emitter (ZrO/W)
Resolution	Point to point 0.27 nm or better Lattice 0.14 nm or better
Accelerating Voltage	Continuously variable up to 200 KV Lower accelerating voltage 80 KV or lower Continuous variable steps 50V or lower
Magnification	Minimum 50x to 6,00,000x or higher (continuously variable)
Spherical aberration coefficient	2.0 mm or lower
Chromatic aberration coefficient	2.1 mm or lower
Pole piece	Cryo pole piece, pole piece gap 7 mm or larger
Illumination mode	High and low magnification, dark field, low dose mode
Vacuum System	Oil-free vacuum system suitable for high resolution analysis. Turbo molecular pump, airlock pumping and separate ion getter pumps for column, gun and liners/apertures Vacuum level in gun area $\leq 10^{-7}$ Pa order
Stage Specification	Computer controlled, side entry eucentric. 5 axis motorized stage with specimen movement on X and Y axis = $\pm 1$ mm or better, Z axis = $\pm 0.4$ mm or better, maximum tilting angle = $\pm 70^\circ$ or higher, sample recall facility. Drift $\leq 0.5$ nm/min with standard holder
Stage Control	Through software as well as manual joystick
Camera	High resolution, 4k x 4k, Peltier cooled CCD camera TEM bottom mount Appropriate for low dose applications CCD size 4096 x 4096 pixels (15 x 15 mm <sup>2</sup> ) Field of view of 61 x 61 mm <sup>2</sup> or larger Multiport readout Software for fully embedding the CCD camera with the microscope
Energy filter	In-column or post-column
Integrated Computer Operating System	High end PC compatible with the system should be provided for control and monitoring of all basic TEM functions like vacuum system, lens, voltage, specimen stage etc. All required computer hardware and software should be part of the microscope operating system. Minimum requirements for PC - CPU: Intel Core 2 Duo 2.6 GHz, Hard disk (300 GB or more), 2 GB RAM, Mouse & Key board system control, USB ports. OS: Microsoft Windows XP/Vista based, Mouse / Keyboard control, Facilities for image acquisition, storage and processing.
Power Requirement	Voltage: 220 V AC/ 50 Hz. Any other requirements must be specifically mentioned by the supplier.
Power Back up	Suitable UPS with one hour back up.
Warranty	Three years comprehensive for microscope and all essential accessories

## B. Cryo- and tomography requirements

Holders	<ol style="list-style-type: none"> <li>1. Single tilt holder</li> <li>2. Dual-axis tomography holder</li> <li>3. Cryo-transfer holder with sample lock mechanism, minimum working temperature <math>-170^{\circ}\text{C}</math> or lower, maximum tilting angle <math>\pm 70^{\circ}</math> or higher. The holder should be supplied with cryotools, cryo-workstation with temperature controller and a dry pumping station.</li> </ol>
Data collection requirement	Microscope and stage should be compatible for cryo-imaging of biological samples under low dose conditions, and able to acquire tilt series from $+70^{\circ}$ to $-70^{\circ}$ or higher.

## C. Essential accessories

Compressor and chiller	<p>220V, 50 Hz, noiseless compressor. 50 Hz chiller, operating temperature <math>18-23^{\circ}\text{C}</math> Equipment should be compatible with the microscope</p>
Softwares	<ol style="list-style-type: none"> <li>1. Software for automated data collection in low dose mode compatible with the system</li> <li>2. Package for single particle reconstruction from 2D images</li> <li>3. Tomography software capable of image acquisition, reconstruction and visualization.</li> </ol> <p>Latest versions and upgrades should be supplied.</p>
Vitrification device	<ol style="list-style-type: none"> <li>1. Fully automated device for plunge freezing of aqueous suspensions</li> <li>2. Working temperature <math>4 - 60^{\circ}\text{C}</math></li> <li>3. Peltier controlled heating/cooling</li> <li>4. Relative humidity 98% or higher</li> <li>5. Time adjustable, double sided blotting capability</li> <li>6. User interface for setting of variables like blotting time, blotting pressure, temperature and humidity.</li> <li>7. Liquid ethane bath, digital temperature sensor (for monitoring temperature down to <math>-183^{\circ}\text{C}</math> or lower), and liquid nitrogen workstation for cooling ethane/cryotransfer of grids.</li> </ol>
Plasma cleaner	<ol style="list-style-type: none"> <li>1. Able to clean both biological TEM specimen support grids, and TEM specimen holders.</li> <li>2. Zero sputtering</li> <li>3. Touch screen to monitor vacuum, time etc.</li> <li>4. Oil-free vacuum pump</li> <li>5. Mass flow controllers for gas mixing</li> <li>6. Pump down time, venting time <math>\leq 1</math> min</li> </ol>
Ultramicrotome	<ol style="list-style-type: none"> <li>1. Separate PC/touch screen control unit</li> <li>2. Mechanical drive system</li> <li>3. LED backlight and sample transillumination</li> <li>4. Adjustable stereomicroscope.</li> <li>5. Cryosectioning attachment with minimum working temperature <math>-170^{\circ}\text{C}</math> or lower, liquid nitrogen dewar should allow continuous work for 8 hours or more.</li> <li>6. Glass knife maker, universal specimen holders, vibration isolation setup, and all tools for operating the ultramicrotome and the cryosectioning attachment should be supplied.</li> </ol>

## **Annexure I**

**Envelope A:** Technical Quote: The following details are to be enclosed (*Mention clearly on this envelope – **Technical Quote***)

1. Technical brochures mentioning all details with complete address of the principals.
2. A compliance chart based on the specifications as per the NIQ.
3. Any optional equipment / accessory advised to be included separately.
4. Installation requirements including gases, chillers, UPS, etc.
5. List and addresses of organizations in India where the equipment has been supplied.
6. Details of other equipment supplied to IIT Delhi specifying the Department/ centre / lab to which the equipment was supplied. Also mention if the equipment is being maintained by your organization.
7. Address of the technical office, in India, with telephone and FAX numbers. Kindly clarify the type of support available in India.
8. If quote is for imported equipment, sole agency-ship certificate on the letterhead of the principal company, if quotation is from an Indian agent.
9. Proprietary item certificate from the principals, if applicable.
10. The agent should be registered for import with the Ministry of Finance / Commerce.

**Envelope B:** Financial Quote: The following details are to be enclosed/ ensured. (*Mention clearly on this envelope – **Financial Quote***)

1. The quotations for the equipment in foreign exchange, if it is to be imported. The cost of spares and optional equipment to be quoted separately. The cost should be based on FOB pricing. If equipment is indigenous, the quote should be in INR and all taxes applicable should be mentioned clearly.
2. Institute makes payment after delivery and successful installation. In case the payment terms are different, it should be mentioned clearly. If equipment is to be imported, the address of the company in whose name the LC is to be opened should be stated.
3. The Comprehensive Three Years Warranty.
4. The details of the AMC after the warranty period.
5. Cost for Installation and training at site, if needed, to be provided.
6. Validity of the quote should be 90 days.
7. The delivery period to be clearly specified.

## **Annexure II**

### **Terms and conditions:**

1. All items from the vendor, as well as any essential or optional accessories from third party should be completely compatible.
2. The vendor will be responsible for the installation and demonstration of all items, including third party items, in IIT-D premises. Likewise, the vendor will be responsible for maintenance of all supplied items, including third party items, for the duration of the warranty.
3. The vendor or its Indian agent/ division must be able to interact with the personnel building the TEM housing, if necessary.