भारतीय विज्ञान शिक्षा एवं अनुसंधान संस्थान तिरुपति
INDIAN INSTITUTE OF SCIENCE EDUCATION AND RESEARCH TIRUPATI
(An Autonomous Institute of National Importance under Ministry of Education, Govt. of India)
C/o. Sree Rama Engineering College, Rami Reddy Nagar, Karakambadi Road,
Mangalam P.O., Tirupati – 517 507, Andhra Pradesh.

**File No: IISERT/PUR/EOI/01/23**

**Expression of Interest (EOI) for Supply, Installation, and Commissioning of Transmission Electron Microscope at IISER Tirupati Main Campus.**

IISER Tirupati is the sixth Institute in the chain of IISERs established by the Govt. of India under the Ministry of Education for imparting quality education in basic sciences and for setting up state-of-the-art research facilities for frontline and cutting-edge research in science.

The permanent campus of IISER Tirupati is situated at Srinivasapuram and Panguru of Yerpedu Mandal. The establishment of IISER paves the way for a unique synergy of one premier educational institute in the country.

The Indian Institute of Science Education and Research Tirupati invites Expression of Interest (EOI) for the Supply, Installation, and Commissioning of Transmission Electron Microscope at IISER Tirupati Main Campus.

An Online pre-indent conference is proposed to be held on 26-Oct-2023 with the prospective manufacturers, their authorized channel partners or agents/suppliers, and system integrators to discuss with the Technical Committee on the aspects of technology, design, specification, clientele, and other related issues for Supply, Installation, and Commissioning of Transmission Electron Microscope.

**Utility of TEM (Transmission Electron Microscopy)**

TEM method is an invaluable tool for studying the nanoscale properties of diverse materials, such as semiconductors, metals, nanoparticles, and $sp^2$-bonded carbon (e.g., graphene, C-nanotubes), soft materials like proteins, peptides, gels due to the high resolution it offers. With this high resolution, it is possible to image crystal structures, defects in the crystal, and individual atoms. It directly provides an image of the spatial distribution of diffracting species within a material. It can be used to analyze the quality, shape, size, and density of quantum wells, wires, and dots of nanomaterials. This capability extends real space metallurgical analysis to the level of atomic dimensions and can be used to obtain both structural and

chemical information about solid-state phase transformations. Structural, and chemical compositional information for various nanoscale materials can be obtained through TEM analysis. Selected area electron diffraction allows phase identification of materials. Dark field and bright field HAADF imaging is of particularly useful for sample analysis for STEM measurements. Material characterization for samples from material science, catalysis, inorganic materials, mineral characterization, soft mater, nanomedicine, peptide chemistry, solid-state chemistry, nanomedicine will be possible using TEM.

**The brief description and requirements for Transmission Electron Microscope are provided below:**

**Specification of 200 KV TEM:**

| S. No | Name of the Specifications/part / Accessories of tender enquiry |
|---|---|
| 1 | **Basic configuration** |
| a. | Acceleration voltage up to 200 KV (variable either in steps or continuously) |
| b. | Electron Source Should be Thermal Scotty Field emitter and minimum Life of emitter should be 3 Years or more. |
| **2** | **Magnification:** |
| a. | Magnification 50 X - 1.5 MX or better. |
| b. | STEM Magnification: Range 200 to 150 MX. |
| 3 | **Resolution:** |
| a. | Point to Point Resolution should be 0.20 nm or better at 200 KV with High Resolution pole piece and Lattice Resolution = 0.10 nm or better at 200 KV. |
| b. | STEM - HAADF resolution should be 0.16 nm or better. Better Field Image resolution 0.2nm or better |
| c. | STEM Should be consisting of BF, DF, and HAADF Detectors. |
| **4** | **Specimen chamber** |
| a. | Goniometer Stage should be Eucentric, Side entry Type , Please mention the Drift rate. Stage must be controlled by a Piezo device; for smooth operation for selecting Fields of View at the atomic level. Minimum Step = 0.05 nm or lower. |
| b. | Tilting angle ± 70 deg or higher with motorized tilting. |

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|---|---|
| c. | Specimen movement X, Y : 2 mm or higher in total or more (Manual, optionally fully computer controlled with specimen position recall facility) |
| d. | Image observation Chamber with Large Fluoroscent Screen should be configured as standard. |
| **5** | **Operation modes (Computer controlled )** |
| | Bright Field Imaging<br>Dark Field Imaging<br>Selected Area Electron Diffraction<br>Microdiffraction<br>Convergent Beam Electron Diffraction |
| 6 | **Lens System** |
| | System consisting of Condensor Lens, Objective Lens, diffraction, Intermediate, Lorentz and Projection Lens. Lorentz mode for magnetic samples should be quoted as standard. |
| **7** | **Data recording systems (TEM Camera)** |
| | Supplier Should quote 20MP CMOS Camera, operating at 200 KV accelerating Voltage, TEM Camera should have following features -- Video recording at full resolution 20MP @ 30fps. |
| **8** | **Specimen holders** |
| a. | Single tilt holder 1 no. |
| b. | Double Tilt Holder - 1 No |
| c. | Automatic Loading and unloading of holders in TEM will be preferable. |
| **9** | **Cooling system** |
| | An efficient automatic temperature controlled closed circuit water cooling system. Proven brand , to be specified. |
| **10** | **Microscopic Softwares** |
| | Upgradation of the softwares has to be supplied free of cost as and when it is required within 10 years of microscope supply |
| **11** | **LN2 Free EDS** |

| | |
|---|---|
| | 1. Large area X - Ray Retractable Detecte should be 100 mm2 or more with windowless facility.<br>2. Solid Angle Should be 0.94 Sr or more.<br>3. Capability of detects elements from B onwards. |
| **12** | **Installation and Commissioning:** |
| | The manufacturer should undertake to install and commission the equipment and all attachments and accessories and also demonstrate the performance guaranteed as per specifications at site. The main system as well as other accessories should run on 220V, 50 Hz single phase AC power supply. SF6 gas for high tension and emission chamber should also be provided by supplier during warranty |
| **13** | **Spare parts** |
| | Assurance about spares availability should be provided. Recommended set of spares and consumables for five years of operation may be quoted as optional items |
| **14** | **Mandatory items to be included in the quote** |
| | Calibration standards: Standard for resolution. This standard should be supplied from ISO certified suppliers with accuracy / traceability etc. Calibration certificates should be provided from ISO 17025 accredited lab. |
| **15** | **Guarantee / Warranty** |
| | The entire equipment must have warranty for free repairs and replacement for the period of 36 months from the date of installation and commissioning |
| **16** | **Training** |
| | On-site training to the researchers by the company person in two phrases. First training for two weeks immediately after commissioning of the equipment and Second training for two weeks after two months of first training should be provided by the vendors. |
| **17** | **The technical specifications should also include the following :** |
| A. | The year of the introduction of the model in world. |
| B. | Date of Manufacturer should be after the date of Purchase Order. |
| C. | List of FEG TEM users in India |
| D. | No. of Service Engineers trained in the above system |
| **E.** | **Compliance statement to each item of this document to be provided along with the Technical Bid.** |

Prospective manufacturers, their authorized channel partners or agents/suppliers, and system integrators are invited to attend a pre-indent meeting with the Technical Committee to discuss all the aspects of the Transmission Electron Microscope including technology, design, features, specification, equipment, and clientele. They are also invited to make a presentation on their company portfolio and expertise, proposed specifications, and a list of accessories required for the FEG TEM, as per the above-mentioned application and requirements of the Institute.

All prospective bidders are requested to kindly send their requests and profiles through email at purchase@iisertirupati.ac.in so as to reach the latest by 25th Oct 2023.

**Date and Time of the Online pre-indent conference:26th Oct 2023 at 03:30 PM**.

The Pre-indent conference will be conducted via Google Meet/Any other virtual mode.

**Contact for information**:

Technical & Commercial contact:
Deputy Registrar (Admin & Purchase)
Indian Institute of Science Education and Research (IISER), Tirupati
Transit campus: C/o Sree Rama Engineering College Campus, Rami Reddy Nagar,
Karakambadi Road, Mangalam (B.O), Tirupati - 517 507
Email: purchase@iisertirupati.ac.in Ph:0877 2500 208/232/233/235
Website: http://www.iisertirupati.ac.in/

**Note:**

1. This notice is applicable to those firms who have experience in the Supply, Installation, and Commissioning of Transmission Electron Microscopes for “Expression of their Interest” to participate in the preparation of specifications and thereafter in the bidding process.
2. The Pre-indent conference will be conducted via Google Meet/Any other virtual mode. Kindly ensure you have an active broadband internet connection for the conference.