

**INDIAN ASSOCIATION FOR THE CULTIVATION OF SCIENCE  
2A & B, RAJA S.C.MULLICK ROAD, JADAVPUR  
KOLKATA -700032**

**TENDER NOTICE NO.SR/S1/OC-18/2012/SG/PSU/13/45 dated  
12.11.2013**

Sealed tenders in two bids system (Technical Bid & Financial Bid) are invited from bonafide, resourceful and eligible manufacturers/exclusive distributors for "**Atomic Force Microscope**"

**Part - I** (Technical Bid) of the tender should contain technical details and commercial terms and conditions and **Part-II** (Price Bid) should indicate group-wise price as mentioned in the Technical Bid where applicable. The Technical Bid and Price bid are to be submitted in two separately sealed envelopes distinctly marked accordingly and both to be put inside another envelope, which should be sealed and superscribed with tender notice no. and due date. The bidders may submit bids duly signed in their own letterheads.

Complete tender should reach **Dr. Suhrit Ghosh**, **Polymer Science Unit**, Indian Association for the Cultivation of Science, 2A & B Raja S. C. Mullick Road, Jadavpur, Kolkata-700032 on or before scheduled date & time specified below.

Tender Notice No.	SR/S1/OC-18/2012/SG/PSU/13/45 dated 12.11.2013
Last date and time of submitting tender	4 <sup>th</sup> December, 2013 at 1.00 P.M.
Pre-bid meeting	22 <sup>nd</sup> November, 2013 at 4.00 P.M. in SN Bose Hall, IACS, Kolkata
Date and time of opening tender	6 th December, 2013 at 4.00 P.M.
Place of opening tender	S.N.Bose Hall, IACS, Kolkata
Contact	e-mail:psusg2@iacs.res.in Tel. +91- 33-2473 4971 (Extn. 1563)

The technical bids will be opened first to evaluate the technical specifications of the equipment thereafter, the **Price bids** of only technically qualified bidders will be opened.

**1) Technical Bid Evaluation:** The Technical Bids will be evaluated in the presence of the representatives of intending bidders who will be able to clarify technical aspects of their bids, if any, required by the Technical Evaluation Team.

**Opening of price-bid:** The Price Bids of the bidders qualifying the technical bid will only be opened, the date of which will be intimated to the short-listed bidders at their email addresses. The rest of the bids will be rejected.

Please note that IACS will not provide any accommodation or expenses to any of the bidders for attending opening of technical bids.

## **2) Technical Bid:**

The Technical Bid should contain technical specifications and kept in a separate envelope duly superscribed as "**Technical Bid**" on the outer side of the envelope as detailed above.

## **3) Technical Specifications for Atomic Force Microscope:**

The Atomic Force Microscope should have a state-of-the-art design and with latest technology for use to analyze various kinds of samples from different fields of science and technology towards higher end research,

### Applications:

Research with soft matters and polymers

### Main System Specifications:

#### **Scanning Features:**

- (1) The AFM system must have sample-scanning technique in XYZ, maintaining the X, Y and Z position of the tip constant with respect to the laser and photo-detector position at all times.
- (2) Also, the AFM should provide auto-tune and auto-phase-adjust, finding cantilever resonance and adjusting phase measurement with a single click.
- (3) This must include full dual lock-in that can provide X or Y components of the cantilever oscillation.

#### **Optics Features:**

The system optics should have the following capabilities:

- (1) Suitable advanced Optics FOV
- (2) 5x or better software controlled, motorized, continuous optical zoom
- (3) 2  $\mu\text{m}$  or better optical resolution

- (4) Capable of attaining 0.75  $\mu\text{m}$  or better optical resolution using optional higher magnification objective
- (5) On axis optical view without any external parts (such as prisms) between objective and tip/sample.
- (6) Bright white-light LED illumination under software control, thermally shielded from AFM head and scanner.

**Minimum Requirement for System Performance:**

The system should achieve atomic resolution on graphite or mica with the large area scanner  $\geq 90 \mu\text{m}$  XY, demonstrable.

- (1) System noise floor in Z, open loop  $< 0.05 \text{ nm}$  ( $< 50$  pico-meter) RMS or better, on large area ( $90 \mu\text{m}$  XY) scanner
- (2) Closed-loop XY noise  $< 1.2 \text{ nm}$  RMS at 1kHz bandwidth
- (3) Z-linearizer noise  $< 0.2 \text{ nm}$  RMS
- (4) Open loop XY drift should be  $< 1 \text{ nm/min}$

**Scanner:**

- (1) The Scanner design of the AFM system must be XYZ Tube scanner.
- (2) Scan range should be up to  $90\mu\text{m} \times 90\mu\text{m}$ , with facility to use as both closed-loop as well as open-loop XYZ using a sensor integrated into the scanner. This should provide Opto-mechanical scan linearization compensating for piezo hysteresis, creep, and nonlinearity.
- (3) The scanner should have unipolar voltage controls for X, Y and Z in order to avoid scanner depolarization.
- (4) The system should preferably allow turning off closed loop while engaged while retaining XY registry

**Standard Modes required:**

The AFM system must be able to perform all the modes without changing and removing scan head.

- (1) Contact mode
- (2) Tapping mode
- (3) Lateral Force Microscopy
- (4) Phase Imaging
- (5) Dual pass scanning technique highly preferred
- (6) Liquid mode
- (7) Conductive AFM

The C-AFM must be with user-selectable gain range around  $10^3 - 10^{11}$  Volts/A and typical noise of around 250 fA at highest gain range. Change in gain stage should not require changing the probe holder.

**Optional Modes / Advanced Modes (for future upgradation as & when needed):**

The AFM system must be able to perform all of the following SPM modes without changing and removing scan head:

Magnetic Force Microscopy (MFM), Electric Field Microscopy (EFM), Force Modulation Microscopy (FMM), Scanning Tunneling Microscopy (STM), Scanning Thermal Microscopy (SThM), Low current STM (must have user-selectable gain range of  $10^3 - 10^{11}$  Volts/A and STM noise level better than 250 fA rms), Surface Potential Microscopy (SPoM), Piezoresponse Microscopy (PZR or PFM), Electrochemical AFM (ECSPM)/STM, Nano lithography, Nano indentation etc.

**Microscope Stage:**

- (1) The AFM system should accept samples with sizes up to 40 mm x 40 mm or more and 16 mm thick or more.
- (2) Also, it must have motorized Z-stage with software-controlled pitch and tilt corrections.

**Ease of Use and Productivity:**

- (1) The cantilever offered must be pre-mounted and pre-aligned, this is essential for easy and rapid probe exchange
- (2) The system must have design to change the cantilevers or samples without removing scan head.

**Control Electronics:**

The AFM system must have state-of-the-art controller and related electronics.

The controller should have:

- (1) 20-bit digital-to-analog converters for scan control in X, Y and Z
- (2) Ultra-low noise high voltage amplifier (say around, <0.1% or better)
- (3) Two independent software controlled lock-in amplifiers with separate amplitude and phase outputs
- (4) Should include 8 dedicated 100 kHz 16-bit A/D converters
- (5) Completely automatic engage under software control
- (6) With minimum Sampling Rate should be of 100 kHz or more.

**Data Acquisition Software:**

**Suitable Data Acquisition Software must be included in the system configuration.**

- (1) Should display 15 imaging windows or more.
- (2) Should have the ability to sweep frequency in both directions in Auto-Tune
- (3) Should have zero phase adjustment capability in phase Imaging for maximum sensitivity (to set the Phase to 'zero' at the operating point)
- (4) Should be capable to provide probe-positioning routine with linking capability to I/V and force curves
- (5) Should be capable to overlay the amplitude & phase signal in Auto-Tune.
- (6) Should have facility for single click transfer of partial images into analysis suite for immediate full analysis during ongoing data acquisition.

**Accessories:**

- (1) Integrated sample heating accessory package up to 60°C. The system should be capable of In-Situ heating of samples in air and liquid with precise temperature control. Both heating element & digital temperature controller must be included.

**Probes / Tips:**

- (1) The respective tips / probes for the standard modes asked in the tender must be included for as per applications. The special tips if any needed for our applications should be quoted.

**Warranty:**

- 12 months from the date of completion installation and commissioning. Please quote warranty for additional 24 months after completion of 12 month standard warranty.

**Installation Base of the quoted model:**

- The vendor should give a user list of Atomic Force Microscope supplied / installed in India. They should have a number of installations in reputed institutions / organizations. They should have at least three nos. of installed systems in Kolkata region for the same quoted model.

**After Sales Service and Application Facilities:**

- The vendor must have excellent after sales service and applications support with a number of service engineers and service centre at Kolkata, and they should have facility to give training to the students.

The service engineers and applications specialists must be experienced and factory trained - will be able to train the deputed person for operations and basic maintenance of the complete AFM system. The response time of the engineer must be within 24 Hrs. Vendor to specify the no of engineers based in Kolkata.

**Installation and Training:**

- (1) The installation and commissioning of the complete system should be carried out by experienced factory trained engineers at our site.
- (2) The respective training to the deputed personnel should be given for required number of days.

**Additional Accessories:**

- Please quote recommended additional accessories and consumables like Tips/Probes, Mica, HoPG, other substrates etc. required for operating the system smoothly.

Technical compliance chart should be provided following the following format\*

Sr. No.	Tender specification	Your offered instrument specification	Extent of compliance

*\*Tender will not be accepted if the technical compliance chart is not provided following the above format.*

- 4) **User List:** The supplier should provide a list of current users (with contact no, Email address etc) for the quoted item in India.
- 5) **Service facility:** Trained technicians should install the instrument and ensure it is operating correctly and within specifications. User training at site should also be provided. Supplier should mention their details of service setup that are responsible for after sales support.
- 6) **Price Bid:**

The financial bid indicating (item-wise) price for the item(s) mentioned in the technical bid should be kept in a separate sealed envelope duly superscribed as "**PRICE BID**" on the outer cover of the envelope as already detailed above. The price bids of only technically qualified bidders will be opened and they will be intimated the date and time of opening of price bids at their email id-(s). Rest of the bids will stand rejected.

7) **Price:** Price to be quoted both on FOB/CIF basis. Name of the particular port from where our authorized forwarder will lift the consignment must be mentioned clearly with FOB price.

8) **Bid Security:**

1. The financial bid should be superscribed as "**PRICE BID**" on the outer cover of the envelope

2. **Bid Security (EMD):** An Account Payee Demand Draft of **Rs.1, 00,000/- (Rupees One Lakh only)** in the name of "**Indian Association for the Cultivation of Science**" is to be furnished by the bidders, as Bid Security money or Earnest Money Deposit (EMD).

3. The Demand Draft for the Bid-Security money should have at least 45(forty five) days validity period after the opening of the Bids.

4. In case of non-award of the work the Bid Security money would be returned to the unsuccessful Bidders.

9) **Performance Security:**

An Account Payee Demand Draft of an amount of **10% of the order value** in the name of "**Indian Association for the Cultivation of Science**" is to be furnished by the successful bidder as Performance security. Performance security money should remain valid for a period of 60 days beyond the date of completion of all contractual obligations of the supplier including warranty obligations. Bid security money will be refunded to successful bidder on receipt of the Performance security money.

10) **General Instructions:**

1. Incomplete & conditional tenders and tenders received after the due date will be summarily rejected without assigning any reasons thereof. **"Dynamic Rotational & Oscillatory Research Grade Rheology Instrument with Peltier temperature Controller "**should clearly be written on the envelope.
2. At any time prior to the bid due date, IACS may, for any reason, whether at its own initiative or in response to a clarification requested by a prospective bidder during pre-bid meeting, modify the bidding documents. The amendment(s) will be notified on the Institute website. **Prospective bidders are advised to occasionally visit the website ([www.iacs.res.in/tender](http://www.iacs.res.in/tender)) for any amendment.**
3. **Payment:** 100% against delivery and successful installation subject to submission of performance guarantee.
4. **Warranty:** Minimum 5 years or 2 years warranty + 3 years annual maintenance contract.
5. **Installation/Demonstration/Application Training at site:** Free of cost by the supplier.
6. **Service facility:** Supplier should mention their details of service setup and Manpower in Kolkata who are responsible for after sales support. Response time should be within 24 hours.
7. **Validity of tender:** Tender submitted shall remain valid at least for three months from the date of opening of the tender. Validity beyond four months from the date of opening of the tender shall be by mutual consent.
8. The tender should accompany a compliance chart.
9. The rate should be inclusive of all taxes, transportation etc. Nothing extra will be paid in addition to the quoted rate.
10. The model number, make, and a printed literature of the product shall be submitted positively.
11. Proposed delivery schedule should be mentioned clearly.



12. Manufacturers/exclusive distributors/vendors should have history of supplying this type of instrument to this or other Scientific Organization.

13. Authorized Dealership Certificate is must in case of principal manufacturing company is not quoting directly.

14. Guarantee certificate, users manuals etc. are to be handed over to the user after successful commissioning of the system.

15. In the event of date being declared a closed holiday for purchaser's office, the due date for submission of bids and opening of technical bids will be the following working day at the appointed time.

16. In case of any dispute, the decision of the Institute authority shall be final and binding on the bidders.

17. For any clarification regarding technical specifications etc. please send your queries to "Dr. Suhrit Ghosh" at [psusg2@iacs.res.in](mailto:psusg2@iacs.res.in)

18. The Institute reserves the right to reject any or all of the tenders received without assigning any reason thereof.

**Registrar**