

NOTICE INVITING TENDER

UGC-DAE Consortium for Scientific Research, Mumbai Centre invites Bids in Two Part (Part A – Technical and Part B – Financial) in sealed cover, from eligible bidders for supply of the under mentioned:

Tender No.	Description of Item	Due date for Submission of Bid
03/2018-2019 dated 10 th January, 2019	SQUID based Cryogen Free Magnetic Property Measurement System	11 th February, 2019

Details of the tender document i.e. Technical Specification and Commercial terms & conditions is mentioned at Annexure-I and Annexure-II respectively.

Annexure-I

Detailed Specifications of the Equipment / Instrument

SQUID (*Superconducting Quantum Interference Device*) **based fully integrated Cryogen-Free Magnetic Properties Measurement System (Magnetometer)**

Requirement is for ONE SET of a fully automated computer controlled cryogen-free SQUID based magnetic properties measurement system operational in the temperature range 1.8 – 1000 K and up to magnetic fields of ± 70 kOe. The instrument should be a proven one for the specified measurement options for the measurements of bulk, thin-film, single crystal and nano-particle based organic, inorganic samples.

Specifications:

[I] Basic System:

1. System should be preferably a closed cycle cryogen free system, where the cool down should start by condensing the high purity helium (He4) gas from an externally connected helium (He4) gas cylinder. The system should have Integrated pulse-tube cryocooler dewar which should not only re-condense the liquid helium directly within the System Dewar but also accomplishes its initial cool-down directly from helium gas, thereby eliminating the need to use any liquid cryogens for the operation of the Systems.
2. The system should be able to operate with as little liquefied helium as possible. The maximum quantity of liquid helium collected through condensation of the helium gas should not exceed 20 liters when the system is operating at its full capacity.
3. Initial cool down must be totally automated process, without the need of any kind of manual intervention. There should not be any need of the external high vacuum pump to complete the process.

4. Approximate initial cooldown time: Preferably 32 hours or less to reach thermal steady state.
5. System must have two He gas bottles connected simultaneously with the automatic switch over when first bottle is empty. This is essential to make sure that the system can be run without needing to change the cylinder for longer time.
6. System must show the status display of the Cylinder.

[II] Magnet Control:

1. Vapour cooled superconducting magnet with longitudinal field with the field strength of **±70 kOe.**
2. Field uniformity: **0.01% over 4 cm**
3. Field charging rate: **Min: 4 Oe/sec to Max: 700 Oe/sec**
4. Field charging resolution: **0.33 Oe**
5. Remanent Field: **≤ 5 Oe**
6. System should have a magnet reset option.
7. Magnet control and any other operations of the magnet should be controllable from the software and integrated in the main control software.
8. Proper shielding should be provided for the magnet to avoid interference to and from the environment, allowing maximum utilization of the lab space.

[III] Temperature Control

A. Normal operation

1. Operating range (in Kelvin): **1.8 to 400 K**
2. Temperature stability: **±0.5%**
3. Temperature Accuracy: **≤ 0.5K or less**
4. Cooling rate:
 - a. Maximum system cooling rate should be **≥ 25K/ min**
 - b. 10 K to 1.8 K stable in **≤ 5 minutes.**
5. System must feature finely tuned flow impedance along with sophisticated temperature control software to allow continuous operation at 1.8 K as well as smooth temperature control through the 4.2 K liquid helium boiling point.
6. System should not use any manual needle valve adjustment to achieve low temperature.
7. At least three thermometers should be available in base system.

B. In Oven mode

8. Temperature range: **300 K – 1000 K**
9. Temperature accuracy: **≤ 2% after stabilizing**
10. Temperature stability: **±0.5%**

[IV] DC Magnetization Measurement:

1. Desired sensitivity of magnetic measurements:
 - a. For low fields (≤ 2.5 kOe): **≤ 5 x 10⁻⁸ emu**
 - i. ***In oven mode:*** **≤ 1 x 10⁻⁶ emu**
 - b. For high fields (≥ 2.5 kOe): **≤ 6 x 10⁻⁷ emu**
 - i. ***In oven mode:*** **≤ 8 x 10⁻⁶ emu**
2. Variable drive amplitude: **0.1 to 8 mm or higher**

3. Desired temperature range for carrying out the magnetic measurements is for a). Normal operation: **1.8 K to 400 K**
 b). With oven option: **300 to 1000 K**
4. The magnetic field range required for the magnetic measurements is **±70kOe.**
5. Maximum DC moment: **10 emu or better**
6. DC SQUID scan measurements should collect at least 600 points or more (SQUID output vs. sample position) to fit and calculate each measurement curve to maximize accuracy. Multiple averages should utilize multiple curves.
7. A typical magnetization versus magnetic field measurement, with magnetic field varying from 0 to 70 kOe, with 500 data points and high resolution of data should not take more than 2.5 hrs and rms noise should be less than 1×10^{-6} emu in the field range of ± 70 kOe.
8. The magnet controller should be able to set the magnetic field in linear, no over-shoot, oscillatory and sweep modes.
9. Smooth temperature control over entire temperature range with no overshoot option. The temperature ramp rate should not be affected specially in the temperature range of 1.8-10K.
10. Sample specifications: Measurements should be possible for thin films, single crystals, bulk and powder samples. (Specify the dimension of sample).
11. The software to use DC scan mode should be fully integrated in the main control software.
12. The basic magnetometer system **should be upgradable** in terms of both hardware and software to include other measurement options in future.

Desirable Options:

a. For dc magnetization measurement option: VSM Mode

1. For measuring magnetization of high magnetic moment samples (for samples with moment > 10 emu)
2. For measuring magnetization at a faster rate and with higher sensitivity of $< 1 \times 10^{-8}$ emu in zero field and $< 8 \times 10^{-8}$ emu at full field (7 Tesla).
3. For measuring magnetization as a function of temperature / field up to 1000 K by using oven option.

b. ac magnetization measurement option

1. For measuring ac magnetization in the ac frequency range of 0.1 Hz to 1 kHz and ac amplitude (peak) from 0.1 Oe up to 10 Oe.
2. For measuring ac magnetization up to 1000 K using oven option.
3. Typical sensitivity of magnetic moment $< 5 \times 10^{-8}$ emu.

[V]Software

1. Robust multifunctional software for controlling the magnetometer, carrying out all experiments / measurements, basic data plotting with possibility of viewing the data as the measurement progresses.
2. Separate software or a module should be able to control the functioning and maintenance of the cryocooler.
3. In the software it should be possible for the user to choose from readymade protocols or write own sequence commands. The software should be user friendly and all the future updates on the software should be provided.
4. All drivers required for the functioning and control of all hardware components of the SQUID magnetometer and cryocoolers should be provided and integrated with the main software(s).

5. Simultaneous display, through software, of data files in graph and text modes. The equipment should include a suitable computer with display unit (monitor) with all required software (operating system, instrument control software etc.) and drivers pre-loaded so that the equipment is ready to use when installed.

[VI] Cryocooler

1. A pulsed tube cryocooler, fully integrated with the main magnetometer system, so that the magnetic property measurement system works as a cryogen free system. The system should be able to start as a totally dry system with no requirement for liquid helium to start the cool-down process.
2. The operation (pumping, gas handling control etc.) and maintenance of the cryocooler should be easy and integrated with the magnetometer system. These operations should be controlled by the software.
3. Estimated cool-down time for reaching the thermally steady state and for reaching the normal helium level should not exceed 72 hours. This includes the time taken from switch ON at room temperature to the start of a normal experiment.
4. The noise contributed by the cryocooler to the measurement should be specified. **It is desired that cryocooler should not have any influence on the system performance**, which is, the noise performance of the magnetometer with and without cryocooler should be identical.
5. Maintenance of the compressor and the cold head should be at least after 20,000 hours of continuous operation of the system. Also, the system should have as little down time as possible.
6. The system must have robust safety features built-in so that no damage occurs to it even in the event of a catastrophic power failure at full field strength.

[VII] IMPORTANT:

1. The quoted system should be complete in every aspect. The offer should include with suitable cables, connectors, high quality Chiller and UPS.
2. The vendors should have the stock of the frequent and necessary consumables in India to reduce the downtime whenever required.
3. The vendor must provide a detail compliance statement with respect to each technical specification in the tender document duly supported by the manufacturer's literature or documents. Any other claim will not be accepted and may lead to rejection of the bid.
4. Vendor should be ready to demonstrate all mentioned specification in similar Cryogen-free system if asked by the user anywhere in India, travel expenses should be borne by the vendor.
5. Only the reputed manufacturer will be considered. At least 10 similar Cryogen-Free SQUID based measurement systems should be installed in India. A user list with the similar systems to be provided.
6. Installation and adequate Training should be carried out by the qualified service engineers at user site. Vendor must furnish the details of the service engineers based in Mumbai and India to ensure quick and regular support.
7. Pre-installation site preparation requirements to be indicated and specified along with the bid.
8. Details of the standard samples to be provided by the company for testing the instruments at the time of installation at site for the demonstration of the performance of equipment.

9. Requirements for cooling water (Chiller) flow should be specified and details and price of such a chiller confirming to requirement should be quoted separately.
10. The physical dimensions of the main unit along with pump console and compressor and other accessories (excluding Water chiller and UPS) should be around 100 x 120 x 250 cm³(L x W x H) and the total weight of this entire unit should not be more than 700 kg.
11. The electrical requirements for the main unit (magnetometer), cryocooler and all other accessories should be compatible with Indian standards. (1 / 3 phase 220-230 / 380 – 440 VAC with current ratings of 6, 16, 32 Amps @ 50Hz).
12. For continuous operation of the system UPS is also desired. A UPS system compatible in terms of rated power and efficiency should be specified. The main magnetometer, cryocooler and other systems should be able to work with such UPS. Details and specifications for the UPS should be specified and quoted separately.
13. Separately quote for all the available options compatible with the system and clearly mention which can be installed only in the factory and which can be installed at the site as well. Also mention the additional hardware/software requirement for each optional feature.
14. Separately quote for spares for minimum one year operation after warranty.
15. Kindly mention about onsite up-gradation possibilities.

ANNEXURE-II

GENERAL TERMS AND CONDITIONS

1. Eligibility Criteria:

- (i) The Bidder should have an average turnover of INR 5.00 (Five) Crores during the period of last 03 (Three) financial years. Last 03 (Three) Financial Years Audited Annual Accounts (Profit & Loss Account and Balance Sheet) to be submitted along with the Techno-commercial (Part-A) bid.
- (ii) Bidder should have registered office and/or authorised Service Centre in India.
- (iii) Bidder must have GST Registration Number, Trade License in India. Necessary proof of documents shall be submitted along with the Techno-Commercial Bid-Part-1.

2. Tender document shall be available at www.csr.res.in. The Cost of the Tender Document : **Rs. 200/- (Two Hundred Only)** (Non-refundable), to be paid by means of **Demand Draft payable at Mumbai** in favour of **UGC-DAE CSR – Non-Plan along with the bid.**

3. Bid Validity: Bid should be valid till 31st, March, 2019. The validity may be extended for a period of Six Months with mutual consent of Buyer and Seller.

4. Tender Fees may also be paid by NEFT or RTGS in favour as understated. In that case the bidder need to submit the relevant documentary

Bank Account No.10536133211	IFSC:SBIN001268
Branch Code: 001268	MICR:400002006
Name of Bank:State Bank of India	Branch:BARC Trombay
Branch Address: Central Admn Bldg Trombay Distt Brihan Mumbai Maharashtra 400085	

5. Rate(s) quoted shall be all inclusive i.e. inclusive of materials, loading, unloading, packing, unpacking, delivery, transportation, supply, installation, testing, commissioning, labour, toll, parking, incidental & any

- other charges and should be in Indian Rupees. However, all the pricing components to be shown separately in the Financial Bid(Part-B).Charges of GST shall be shown separately. Quoted Rate shall be fixed and price escalation shall not be accepted under any circumstances.
6. The delivery period must be mentioned in the Offer. Any charges that may arise due to extension of delivery schedule, etc. shall have to be borne by the Seller. The delivery shall be made through multimodal transport facilities vide Air-Road.
 7. Offer should be accompanied with product catalogue, brochure and relevant pamphlets etc.
 8. The quantities mentioned in the tender document are tentative in nature and may vary at the time of placement of formal Purchase Order. Institutional discount, wherever applicable, should be mentioned separately.
 9. Payment shall be made only after receiving complete articles in good and satisfactory condition along with invoice in Duplicate. Necessary Bank particulars of the seller to be provided.
 10. The payment shall be released only if the item supplied and received according to specification unless any change is otherwise agreed in writing. No advance payment in part or full shall be made.
 11. Centre-Director, UGC-DAE CSR shall not be liable for any postal delay.
 12. Offer without meeting the technical and commercial criteria & requirements may bear the risk of not being considered. In that case the Price bid of the respective bidder shall not be opened.
 13. The Centre-Director reserves the right at their sole, to accept any Offer for whole or part quantities or to reject any or all Offers without assigning any reason thereof. No claims for compensation or otherwise whatsoever shall be entertained.
 14. The seller at their risk and cost shall arrange transit insurance up to Mumbai.
 15. Any disputes arising between both parties in connection with this transaction shall be referred within Jurisdiction of the Competent Court in the City of Mumbai.
 16. The decision of the Centre-Director shall be final in all the cases.
 17. All technical and commercial terms, conditions, declarations, documents should be enclosed in Techno-Commercial Bid in a separate sealed envelope and superscribed as PART -A.
 18. Only Rate shall be quoted in Financial Bid in separate sealed envelope superscribed as PART- B.
 19. Both the envelope i.e. PART-A and PART-B shall be Sealed within a cover envelope and Superscribed as 'Offer against NIT No. and Due Date.' The Offer should be send by Speed/Register Post **(No private/local couriers are permitted inside BARC, Mumbai)** to the Centre-Director, UGC-DAE CSR, Mumbai Centre, CFB, 246-C, 2nd Floor, BARC, Trombay, Mumbai – 400085 latest by 11th February, 2019.

For any query related regarding the Tender, Kindly Contact at. : 022-25505327 or email at udcsr.mum@csr.res.in

Centre-Director