REF: PH/AGH/2019-20/417 Date: 28th January 2020

Tender Notification for the procurement of a cryogen free variable temperature suerconducting magnet system

(Last Date for submission of tenders: 20 February 2020)

Kindly send your best quotation for the following item on C.I.P. Bangalore basis. Your quotation should clearly indicate the terms of delivery, delivery schedule, E.D., payment terms etc. The tender should be submitted in **two separate sealed envelopes** - one containing the technical bid and the other containing the commercial bid, both of which should reach us, duly signed on or before 1700 hours 20th February 2020.

Please enclose a compliance certificate along with the technical bid.

Yours Sincerely,
Chairman
Department of Physics

Separate labelled and sealed technical and commercial bids should be sent to:

Prof. Arindam Ghosh
Professor
Department of Physics
Indian Institute of Science
Bangalore - 560012, India

Specifications of the product – Cryogen-free variable temperature superconducting magnet system with the following components and minimum specification:

1. Pulse tube based cryogen-free system with two stages of cooling and a cooling power of at least 1W at 4.2 K.
2. Appropriate water cooled helium compressor with full charge of high purity Helium gas, with at least 15 m flexible SS lines. Electrical and cooling water requirements for the compressor must be specified. Maintenance interval for the compressor must be atleast 30,000 hours and for the cold head must be atleast 20,000 hours.
3. Variable temperature insert (VTI) with appropriate heat shields and sample in vacuum option. Temperature range of operation must cover 1.6 K - 400 K. Provide supporting data. Appropriate gas handling syatem for operation of the variable temperature cryogen free insert.
4. Motorized needle valve, with PID and associated computer control.
5. Sample space of at least 45 mm.
6. Cryogen free 14 Tesla superconducting magnet with a homogeneity of 0.1% over 1 cm^3 volume. The magnet should be equipped with a persistent switch and quench protection circuitry. The magnet should be fitted with thermometer to monitor its temperature. The bore of the magnet should be atleast 50 mm in diameter.
7. Appropriate four-quadrant magnet power supply for 14 Tesla magnet with ability to continuously sweep the magnetic field to positive and negative values through zero.
8. Calibrated field independent temperature sensors mounted on the sample position and magnet plate for high precision temperature measurements. Additional temperature sensors on cryocooler 1st and 2nd stages, 1.5 K pot, persistent switch and VTI.
9. Appropriate heaters on 1st stage, 2nd stage, magnet plate, sample position and VTI suitable for faster warm-up of the system.
10. Temperature controller(s) to simultaneously monitor the 1st stage, 2nd stage, magnet plate, 1.5K pot and sample insert temperatures, preferably with two additional sensor inputs for custom-use.
11. The entire system must be modular with an option to field upgrade to He-3 refrigerator in future with base temperature of ~300 mK.

12. Modular mechanical single axis sample rotator to rotate sample from in-plane to out of plane magnetic field. Specify range of rotation and resolution. This should work for sample in vacuum and preferably be operated via computer control and compatible with VTI and also, He-3 insert (see optional items).
13. 10 numbers twisted pair constantan wires down to the sample holder. The wires should have suitable connectors terminating at the top to (preferably Fischer connector). Additional blank port at the top of the probe, with access to sample for additional wiring in future if necessary.
14. 10 numbers flexible co-axial cables with suitable termination down to sample holder. The wires should have suitable connectors terminating at the top (preferably SMA connector).
15. Two semi rigid high frequency coax lines (UT85 SS-SS frequency up to 20 GHz) with SMA connector on one end and left loose at sample end.
16. Appropriate safety pressure release valves on the cryostat.
17. Appropriate dry scroll pump for the VTI space including hoses, valves and fittings required for VTI operation to be supplied.
18. Appropriate system software suite (preferably in LabVIEW) to control all aspects of the system operation and measurements including magnet control, temperature control with flexibility to add modules by the user for customized measurements.
19. Vendors must provide the supporting data for temperature stability, initial system cool down time, cool down time after sample exchange, vibrations, heat load and other critical parameters.

Optional Items:

1. Variable temperature He-3 insert capable of reaching base temperature of ~300 mK (without load) and maximum sample base temperature of 400 K and compatible with the above pulse tube-based cryogen free and superconducting system.
    a) 20 pin LCC sample holder compatible with He-3 VTI with ESD protection with single axis mechanical sample rotator to rotate sample from in-plane to out of plane magnetic field. Specify range of rotation and resolution. This should work for sample in vacuum and preferably be operated via computer control.
    b) 10 numbers twisted pair constantan wires down to the sample holder. The wires should have suitable connectors terminating at the top to (preferably Fischer connector). Additional blank port at the top of the probe, with access to sample for additional wiring in future if necessary.
    c) 10 numbers flexible co-axial cables with suitable termination down to sample holder. The wires should have suitable connectors terminating at the top (preferably SMA connector).
    d) Two semi rigid high frequency coax lines (UT85 SS-SS frequency up to 20 GHz) with SMA connector on one end and left loose at sample end.
    e) Additional temperature sensors on He-3 VTI for monitoring temperature of different parts of the He-3 insert like He-3 sorb, 1 K plate and He-3 pot.
2. 20 pin LCC sample holder compatible with He-3 VTI with dual axis sample rotation option (modular attachment). This should work for sample in vacuum and preferably be operated via computer control.
3. Pumping station with turbo pump and dry backing pump.
4. Vibration isolation support mount.

Terms and conditions:

1. The vendor should have a track record of having previously supplied at least THREE similar equipment in India (please furnish the contact details of the customers).
2. The vendor should have qualified technical service personnel for the equipment based in India (preferably in Bangalore).
3. The quotation will be in foreign currency.
4. The payment will be through confirmed irrevocable Letter of Credit.
5. Alternate modes of payment can be suggested with suitable justification.
6. The lead time for the delivery of the equipment should not be more than 6-8 months from the date of receipt of our purchase order.
7. The instrument must carry a comprehensive warranty of 3 year from the date of installation.

Yours sincerely,

Prof. Arindam Ghosh
Professor
Department of Physics
Indian Institute of Science
Bangalore - 560012, India