



CSIR - NATIONAL PHYSICAL LABORATORY

(Council of Scientific & Industrial Research)

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From: Director, CSIR-NPL

Dt.:

Dear Sirs,

Sub.: INVITATION FOR PRE-INDENT CONFERENCE –Intimation Regarding

National Physical Laboratory (NPL), a premier R&D unit of Council of Scientific & Industrial Research, intends to procure the following items as per schedule follows (as per pointer advertisement placed at Annexure -II):

SN.	Ref. No.	Brief details of item(s)	Purpose	Date & Time of PIC	Venue
1.	14-IV/MS(57)13-PB	High efficiency Variable Temperature Optical Nitrogen Shielded Helium Cryostat	To be used for low temperature measurements on SNSPD.	June 19, 2013 at 10.00 A.M.	Conference Room, 2 nd Floor, Main Building, CSIR- NPL, New Delhi -12
2.	14-VI/AD(710)13-PB	High Temperature Vibrating Sample Magnetometer (VSM)	To measure magnetic properties of bulk solids, liquids, powders, pellets and thin materials etc. System should measure and display Hall voltage, resistance, magneto resistance, I-V characteristics of given samples.	June 24, 2013 at 2.30 P.M.	

In this regard, **Pre-Indent Conference (PIC)** are being organized to finalize the broad technical specifications of the required system(s) as mentioned above. Prospective OEMs or their Authorized Distributors, System Integrators having specialization and experience of such installations and their maintenance thereof are invited to make presentations followed by discussions on technology, design, features utility, technical parameters and other related Techno-commercial issues. The credentials, technical capability, financial standing & track record of vendors, will be evaluated, based upon PIC discussions and documents submitted by the interested parties. For this purpose brief details and purpose of requisite equipment is enclosed at Annexure –I.

Further the detailed scope of PIC and other conditions can be seen on NPL website: <http://www.nplindia.org> under “Tenders/Pre-Indent” → “Pre-Indent Conference Notifications” link. Parties willing to participate must send a formal communication and queries, if any, to Controller of Stores & Purchase (emails: cosp@nplindia.org / spo@nplindia.org), in advance.

Interested parties willing to take part in the above said PIC are requested to submit the documents to prove their Technical Capabilities, Client List, Financial Capabilities, Experience and Credentials at the time of attending of PIC along with Vendor Registration Form as per Annexure -III. A Line of confirmation in this regard may be sent.

Thanking you,

Yours Faithfully,

Encl: A/A

(Tariq Badar)

Controller of Stores & Purchase

Ref. No.: 14-IV/MS(57)13-PB**Specifications of “High Efficiency variable temperature optical nitrogen shielded helium cryostat”****1. Liquid Helium (He) Dewar with all welded tail and Nitrogen jacket.**

- Liquid Helium capacity: 10-15 liters.
- Liquid Nitrogen capacity: 10-15 liters.
- Appropriate calibrated sensors installed on heat exchanger and/or wherever required.
- All other necessary attachments and components required to achieve a guaranteed temperature ≤ 1.5 K to 300 K for measurement.
- Arrangement to prevent icing and blockages.
- Compatible safety valves, pressure relief valves, Compound Pressure Gauge, liquid N₂ fill and vent ports, He fill and recovery port, blind flange as per standard and safety rules.
- Liquid He transfer line.
- Liquid He level meter and indicator.
- Compatible evacuation ports with accessories.

2. Probe for low temperature applications and microwave measurements.

- Appropriate sample heater arrangement to stabilized temperature in the range of 1.5 K to 300 K.
- A total of 10 electrical wires from top of probe to sample holder for electrical measurements. The sample wires should be connected to a separate multi-pin connector at the top of the probe.
- An optical fibre from top of probe to sample holder for illumination of sample.

3. Semi-rigid microwave/ RF cable

- Compatible to the working frequency range of 0-40 GHz for cryogenic applications and compatible with the cryostat and suitable connectors on both sides.

4. Sample Holder

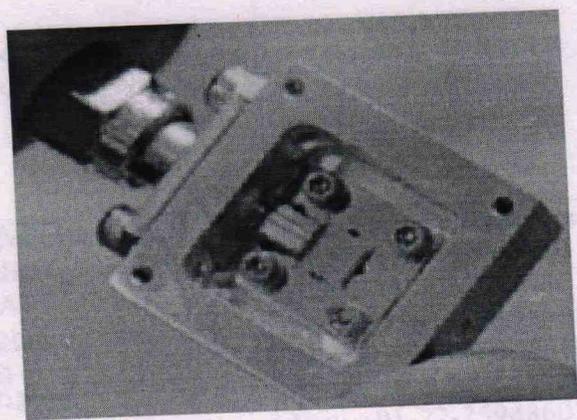
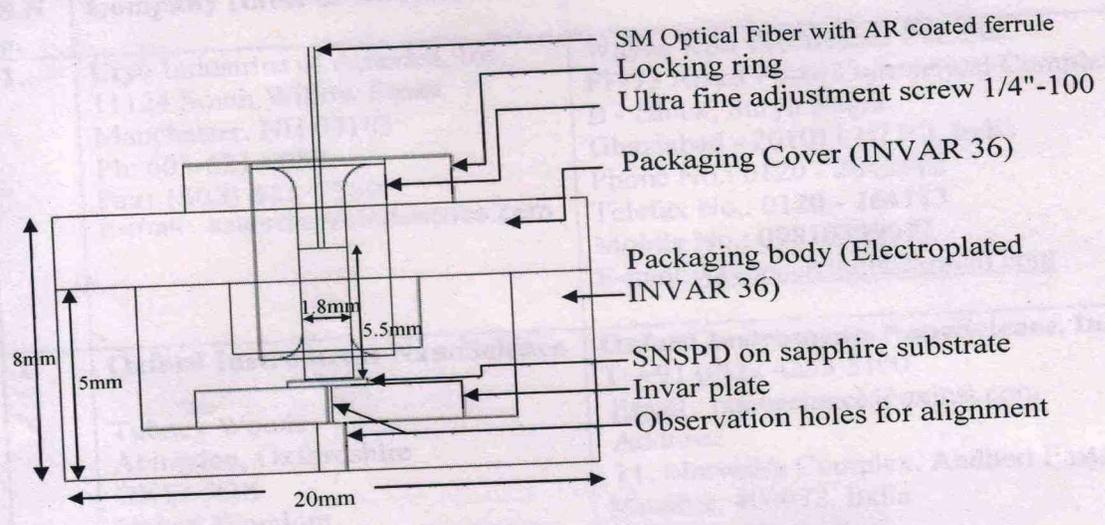
- Changeable sample holder of minimum thermal linear expansion coefficient, namely carpenter INVAR 36 (design attached).
- Appropriate calibrated temperature sensor/s installed on sample mount block and/or wherever required.

5. Cryogenic Temperature Controller and indicator (salient features are listed below):

- Monitoring and Control of Operating temperature in the 300 K to 1.5 K range.
- Four sensor inputs and four independent control outputs.
- Compatible to diodes, RTD, Cernox and thermocouples sensors.
- Interface through Ethernet, USB, IEEE-488.2, RS-232 with respective compatible cables and connectors.
- Compatible software to handle calibration curves through PC.
- Display resolution: 6 digits or better.
- PID control loops for suitable heater.

6. Compatible pump and accessories for the Cryostat.**7. Power requirement: as per Indian electrical standard.**

Sample Holder



Reference: A thesis on "Packaging and characterization of NbN Superconducting Nanowire Single Photon Detector" by Jean-Luc FX. Orgiazzi 2009

**TECHNICAL SPECIFICATIONS FOR VIBRATING SAMPLE
MAGNETOMETER WITH MAGNETO RESISTANCE OPTION**

System should be capable to measure magnetic properties of bulk solids, liquid, powders, pellets and thin films materials etc.

System should measure and display Hall voltage, resistance, magneto resistance, I-V characteristics, of given samples.

Electromagnets:

Should have Variable Pole Gap Electromagnet

Field strength:

Minimum 25 kOe and Maximum higher than 30kOe for room temperature measurements.
20 – 25 kOe for high temperature measurements Oven mode.

The electro magnet should have necessary pole face diameter of 50 ±5mm to ensure uniform magnetic field (better than 1% in a gap of 25 mm) in the sample zone.

The gap geometry of the Electromagnet should be able to accommodate

- a) Varying sample sizes (1mm to 15 mm).
- b) Cryostat and Oven assemblies for low and high temperature studies
- c) Magneto Resistance (MR) accessory.
- d) Hall probe

Sample Holder, High Precision Sample Rotation Mechanism & Vibrator Assembly.

Sample Holder:

- i) The sample holder must be designed in such a way that the sample is free from lateral vibrations.
- ii) Sample holders should accommodate a wide variety of samples such as bulk solids, liquids, powders and thin films.
- iii) Provision for analyzing very small amounts of powder sample
- iv) Sample exchange mechanism should be easy and quick.
- v) A head assembly with quick disconnection of sample rod allowing for easy, fast and reproducible sample exchange would be preferable.

Sample Rotation Mechanism:

A precision rotational drive that provides minimum 360 degrees of sample rotation for angular measurement of magnetic properties should be provided.

Minimum angle program resolution: 1° or better

Repeatability of angular position: better than 1°.

Vibrator assembly:

- i) The vibrator assembly should be designed for standard frequency range and mounted on a rigid frame.
- ii) Sample rod fixture should be designed for easy loading with reproducibility in positioning X – Y directions.
- iii) The vibrator assembly should not have lateral movement/vibrations.

Sensors for measurement of magnetic moment (Sensor coils) & magnetic fields (Hall probe gauss-meter).

Magnetic Moment Measurement

The design and mounting of the pick-up coils should optimize the magnetic coupling with the sample.

Use of different coils for different sample sizes is preferred.

The details are as follows:

Sensitivity: 1 micro emu or better

Dynamic Range: 0.1 micro emu to 1000 emu

Moment Accuracy: Better than 1 % of reading

Reproducibility: Better than ± 0.5 % or ± 0.1 % of full scale

Noise Level: 0.1 micro emu at 10 sec/point or better for room temperature

2.5 micro emu at 10 sec/point or better with oven or cryostat option.

Accessories for thermo magnetic studies (High temperature Oven)

High Temperature Accessories

The VSM system should be upgradable with the closed loop variable temperature cryostat and high temperature furnace with temperature controller and should have all the essential accessories to install these in the magnet gap.

The high temperature oven should be capable of generating temperatures in the range of 300 – 1273 K with temperature accuracy of ± 1 K. Higher temperature capabilities are preferred.

Additional features

- The sample rod should be light weight and rigid, compatible for cryostat and high temperature measurements.
- Simple technique to center the sample along the X, Y and Z axes.
- Sample mounting and dismounting should be simple
- Simple procedure to Position the cryostat and oven
- To provide system flexibility, all sub-assemblies may be on wheels.

Operational Power Supply

The magnet power supply and the system console operate on as per Indian Electrical Standard conditions.

Magnetic Moment Standards

- Magnetic standard – Ni sphere. Min. of three nos. (Kindly specify the standards like, Palladium or ultra high purity nickel etc.)
- The Saturation Magnetic Moment of standards and their saturation magnetic field at which this is determined should be specified. The magnetic moment quoted for the standards should be traceable to fundamental standards.

Computer System: Suitable computer along with software to control, acquire the data and store on the HDD, can do offline analysis, display and print results, should have windows platform.

The VSM should internally measure, process and store the measurement and analysis parameters. Selection of CGS and SI system of units is required.

OPTIONAL

Accessories for thermo magnetic studies (variable temperature Cryostat with temperature controllers) and Magneto Resistance (MR) measurements.)

Low Temperature Accessories

The variable temperature cryostat should be capable of generating temperatures in the range of 80-400 K with the temperature accuracy of ± 1 K. Lower temperature capability is preferred. (Optional-quote separately)

Vacuum pumping station for using with high temperature oven. Should be able to achieve better than 10^{-5} torr.

Accessory for Magneto Resistance Measurement

- The accessory must be capable to measure magneto-resistance as a function of field at high temperatures.

Spares (To be included as optional)

- The vendor should include in the quotation adequate spares for five years of trouble free operation of the system.
- Electronic spares, Hall Probes, Pick-up coils, temperature sensors, thermocouples, sample holders (rods, cups etc.), oven assemblies, slow / fast blow fuses, HRC fuses etc. may be included in the list of spares.



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PRE -INDENT CONFERENCE NOTICE No: 04/2013

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Sd/-
(Controller of Stores & Purchase)

VENDOR'S INFORMATION FORM

[The interested party shall fill in this form and should submit at the time of attending PIC. This should be done on the letter head of the firm]

1. Vendor's Legal Name :

2. Vendor's actual or intended Country of Registration :

3. Vendor's Legal Address in Country of Registration :

4. Vendor's Authorization Representative Information

Name :

Address :

Telephone/Fax numbers:

Email Address :