



INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai - 400076

Technical Specification :

A complete microscopy cryostat (continuous flow design usable with liquid helium and liquid nitrogen) solution for high-resolution microscopy comprising following equipment with given specifications -

Specifications for the cryostat :

(All specifications are critical for the use of the cryostat and must be met. Partial matching is not acceptable)

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| Cryostat orientation | To be used in horizontally mounted configuration (Preferably usable in both horizontal and vertical configurations) |
| Sample environment | In vacuum |
| Temperature range | At least 2.75 K to 500 K and continuously controllable |
| Temperature stability | Up to +/- 100 mK |
| Cooling time (with pre-cooled siphon) | Less than 15 minutes |
| Weight | Less than 1.75 kg to be accommodated on the customized platform |
| Cryostat height | Between 44 to 50 mm to be accommodated on the customized platform |
| Bottom flange diameter | Less than 100 mm (including mounting plate) to be accommodate on the customized platform |
| Overall length (including ports and adaptors) | Between 480 to 500 mm |
| Sample size | At least 15 mm diameter and 3 mm in height |
| Top and bottom flange with optical (synthetic fused silica or spectrasil B) | Window thickness 1.5 mm and clear aperture of at least 25 mm (At least 135 degrees angle of admittance at the sample holder surface) |
| Minimum distance between the sample holder surface and the window top surface for 0.5 mm thick window | Less than 2.5 mm |
| Adjustability in working distance | At least 3 mm |
| Vibrations | Less than 20 nm |
| Lateral sample drift at a stable 4.2 K temperature and while cooling | Less than 200 nm/hour at stable 4.2 K and less than 15 microns while cooling |
| Cryogenic consumption for Helium litre/hr at 4.2 K and while cooling | Less than 1 litre/hour at 4.2 K |
| Sample holders | Individual sample holders suitable for reflection and transmission measurements |
| Electrical connections for the sample in vacuum | Ten pin electrical connector wired to terminals with appropriate socket and cover |
| Sample temperature measurement and control | A temperature sensor and heater for the entire range of 2.7 to 500 K |

Specifications for the flexible transfer siphon to connect the above cryostat with liquid nitrogen or liquid helium dewar: 1 nos

(All specifications are critical for the use of the cryostat and must be met. Partial matching is not acceptable)

- Lightweight and flexible siphon with gas cooled radiation shield, which is suitable for entry into the above cryostat in horizontal format (cryostat mounted on a customized microscopy platform)
- Manually operated coolant control
- Usable with 30 litres to 120 litres liquid nitrogen and liquid helium dewars
- Length 1 to 1.5 m
- Diameter 10 to 20 mm
- Necessary connectors, cables, and accessories

Specifications for the oil-free gas flow system for the above mentioned cryostat and transfer siphon: 1 nos

(All specifications are critical for the use of the cryostat and must be met. Partial matching is not acceptable)

- Continuously controllable temperature up to minimum achievable temperature of 2.7 K
- Gas flow controller system with vacuum gauge, flow meter (for helium and nitrogen), and flow control using needle valve
- Nominal pumping speed of 50 to 100 litre/second at about 1000 mbar
- Necessary connectors, cables, and accessories

Specifications for temperature controller for the above mentioned cryostat system: 1 nos

(All specifications are critical for the use of the cryostat and must be met. Partial matching is not acceptable)

- PID loop based temperature controller for at least one sensor and one heater mounted in the above mentioned cryostat sample chamber
- Capable of continuously varying the temperature in the range 2.7 to 500 K
- Necessary connectors, cables, and accessories

Following accessories to be included in the quotation :

1. Top flange for the above cryostat with optical window (synthetic fused silica or spectrasil B) having 1.5 mm thickness and at least 25 mm clear access diameter (at least 140 degrees angle of admittance at the surface of the sample holder): 1 nos
2. Top flange for the above cryostat with optical window (synthetic fused silica or spectrasil B) having 0.5 mm thickness and at least 10 mm clear access diameter (at least 100 degrees angle of admittance at the surface of the sample holder): 1 nos
3. Bottom flange for the above cryostat with optical window (synthetic fused silica or spectrasil B) having 1.5 mm thickness and at least 25 mm clear access diameter (at least 140 degrees angle of admittance at the surface of the sample holder): 1 nos

4. Bottom flange for the above cryostat with optical window (synthetic fused silica or spectrasil B) having 0.5 mm thickness and at least 10 mm clear access diameter (at least 100 degrees angle of admittance at the surface of the sample holder): 1 nos
5. Bottom flange without optical window: 1 nos
6. Liquid helium dewar with 50 to 100 litre capacity: 1 nos

A complete microscopy cryostat system for high-resolution microscopy comprising cryostat (continuous flow design usable with liquid helium and liquid nitrogen), flexible transfer siphon to connect to liquid He or liquid nitrogen dewar, top and bottom flanges with windows, gas flow control, and temperature controller: 1 nos

Project title: Investigations of strong radiative coupling between excitons and surface plasmon polaritons in single hybrid semiconductor-metal nanoantenna

Lab where the equipment will be installed: Room no. 330, 3rd Floor, Physics Department, IIT Bombay

Mandatory requirements:

All items mentioned below are essential for a complete microscopy cryostat solution (usable with liquid helium and liquid nitrogen), and must be quoted. Partial quotation are not acceptable. All electrical appliances to be used in India (220 V, 50 Hz).
Installation: On-site without additional costs.

Warranty: One year from the date of installation/commissioning of the equipment.