INDIAN INSTITUTE OF TECHNOLOGY BOMBAY

MATERIALS MANAGEMENT DIVISION

Powai, Mumbai 400076.

Item Description: Custom photonic chip characterization setup spectrometer

PR No. 1000049423 RFx NO.6100002320

Sr. No	Item description	Technical compliance (YES/NO)	Additional information (if any)
A	**Scope & Intent:** Supply, installation, and commissioning of a high-performance imaging spectrograph and scanning monochromator system with accessories, gratings, EMCCD detector, and acquisition/calibration software. The specification defines capabilities that represent the state-of-the-art in precision spectroscopy. Only solutions that meet all capabilities below—without third-party plug-ins, workarounds, or custom development—shall be considered compliant.		
B	**Imaging Spectrograph / Scanning Monochromator Core**		
i.	Focal length: 500 mm (or more) class with dual entrance ports and dual exit ports supporting operation as both spectrograph and monochromator.		
ii	Optical paths: Simultaneous 90° and 180° optical path configuration with motorized computer-controlled exit-port mirror.		
iii	Integrated grating drive: Auto-initialization drive that identifies turret and installed gratings and performs automatic optical alignment on startup, enhancing accuracy and repeatability.		
iv	Native spectral deconvolution: Built-in algorithm that improves spectral resolution from ≤0.07 nm to ≤0.05 nm without hardware modification.		
v	Calibration ecosystem: Push-button automated wavelength & intensity calibration with accuracy improved to ±0.01 nm compared to baseline ±0.2 nm; reproducibility ±0.05 nm; grating change repeatability ±0.02 nm.		

vi	Entrance/exit configuration: Dual independent entrance ports (two separate entrance slits/ports) to allow two simultaneous input channels or flexible coupling. At least one side exit slit and one end-array detector port with direct mechanical and optical coupling for array detectors. Motorized computer-controlled exit-port selection mirror for switching between exit ports without manual intervention The entrance & exit slits must be available as motorized, software-controllable versions, allowing adjustment from 10 µm to 3 mm via the acquisition/control software (no separate controllers or third-party drivers)		
vii	Fiber coupling accessory for one of the two entrance slits.		
viii	Aperture: f/6.5 astigmatism-corrected optics or better.		
ix	Turret: Interchangeable triple-grating turret or better.		
x	Grating format compatibility: Must accept both 68 × 68 mm and 68 × 84 mm gratings.		
xi	Dual focal planes ≥14 × 30 mm each for mounting and operation of two cameras simultaneously.		
C	**Optical & Wavelength Performance**		
i	Spectral coverage: at least 105–4000 nm (UV–VIS–NIR or better) using appropriate gratings and detectors.		
ii	Scan range: 0–1500 nm (or better) continuous.		
iii	Minimum wavelength step size: 0.002 nm per step (or lower).		
iv	Wavelength accuracy: ±0.2 nm standard; improved to ±0.01 nm with automated calibration (or better).		
v	Wavelength reproducibility: ±0.05 nm (or better).		
vi	Grating change repeatability: ±0.02 nm (or better).		
vii	Reciprocal linear dispersion: ~1.52 nm/mm (500 mm class) or better — bidders to provide exact dispersion curves for each supplied grating.		
viii	Spectral resolution: ≤ 0.07 nm (CCD mode), improved to ≤ 0.05 nm with native deconvolution.		
ix	Optical coatings: Enhanced aluminum (UV–IR) or protected silver with ≥98% reflectivity (NIR–400 nm).		

D	**Gratings (Initial Set)**		
i	Ruled grating, 150 g/mm with ~800 nm blaze wavelength.		
ii	Ruled grating, 600 g/mm with ~500 nm blaze wavelength.		
iii	Ruled grating, 1800 g/mm with ~750 nm blaze wavelength.		
E	**Accessories**		
i	Entrance slit shutter controllable directly by the acquisition software and camera.		
ii	Universal fiber coupler with X–Y micrometer control (~0.12 inch travel) including interchangeable ferrule, SMA-905, and FC adapters; includes slit baffle compatible with the spectrograph.		
F	**Detector (EMCCD)**		
i	Back-illuminated EMCCD detector, 1024 × 1024 pixels, 13 µm pitch.		
ii	Fringe suppression technology for minimized etaloning with high sensitivity across UV–NIR.		
iii	Peak quantum efficiency >95%.		
iv	Thermoelectrically cooled permanent-vacuum camera head.		
v	High-speed readout: ≥30 MHz (or faster), 16-bit ADC (or more).		
vi	Data interface: Gigabit Ethernet (GigE).		
G	**Acquisition & Control Software**		
i	Single software platform must provide native control of both spectrograph and detector.		
ii	Built-in math engine for real-time and post-acquisition processing.		
iii	Native scripting interfaces for MATLAB, Python, and LabVIEW with example codes included.		
iv	Automated wavelength & intensity calibration routines must be natively supported.		

v	Support for multiple export formats: TIFF, FITS, ASCII, AVI, IGOR, Origin.		
H	**Mechanical & Compliance**		
i	Computer interface for spectrograph control: USB 2.0 or higher.		
I	**Deliverables, Services & Warranty**		
i	Supply, installation, commissioning, and user training at customer site.		
ii	Factory test reports of the supplied equipment and on-site demonstration to reproduce the aforementioned test results of performance		
iii	Printed and electronic user manuals for spectrograph, detector, and software.		
iv	Warranty: 1 year comprehensive OEM warranty including software updates.		
J	**Mandatory Compliance Statement:** Bidders must provide a point-by-point compliance matrix (Compliant/Not Compliant) with verifiable datasheet/user manual references for each line item. Any response marked “Equivalent” or requiring external software/drivers will be deemed non-compliant.		