Central University of Rajasthan

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CURAJ/Purchase/Tender/2023-24/ 652 **Dt. 26.05.2023**

CORRIGENDUM

This has reference to the tenders vide Tender No. CURAJ/Purchase/Tender/2023-24/147/346 dated 26/04/2023 for the supply & installation of High-End Microscope with optical tweezer at Central University of Rajasthan.

Technical specifications have been amended for the High-End Microscope with optical tweezer as **Annexure –I**

Bid submission extended up to 09.06.2023 upto 2:00 PM.

All other terms and conditions will remain same.

-sd Registrar
Central University of Rajasthan

Annexure –I

Technical Specification of High-End Microscope with optical tweezer

Name of the equipment: High-End Microscope with optical tweezer

GENERAL INSTRUCTIONS:

- High-End Microscope with optical tweezer should be an all-in-one system incorporated with Laser, standard optical microscope, microscopic objective lens, condenser lens, camera, detector, sample preparation kit, IR laser detection card, IR laser safety glass including all minor components such as mirror, dichroic mirror, lenses, beam collimator, optical cage stand, and slide holder etc.
- This system should be capable of trapping microscopic particles, and biological samples with automatic trapping force measurement, particle tracking module, and software package for full computer control of the 3-axis piezo-driven sample positioning stage and to read out the back focal plane detector (interferometry via PSD or QPD) signal. It also includes software for the CCD/CMOS camera for video imaging.
- Spatial light modulator should be provided to externally generate different structured laser beam profiles to be used for particle trapping.
- This complete system should be capable to measure single-molecule force measurement and be upgradable to simultaneous single-molecule fluorescence, escape force measurement, adhesion experiment, manipulation of the object inside cells, rheology applications, 3d and active tracking, live cell experiments, cell-particle interactions, and infection studies, etc.
- Installation certificate will be issued only after satisfactory working of the instrument (Demonstration of all the modules) and onsite training at CURAJ, for faculty, staff, and research scholars.
- This complete system should be assembled on a necessary/suitable honeycomb vibration isolation science optical table (metric).
- There must be a port to insert the outside laser beam into the optical tweezers set up through a predefined path of the laser beam of the system.
- The vendors should highlight and specify any additional functionalities of their system that enhance the capabilities of the system or the ease with which the user can process and analyze the data and provide information about the value addition from such functionalities. This may be optional.
- The vendor should issue an undertaking for the availability of spare parts for at least TEN YEARS from the date of a successful installation.
- Vendor has to demonstrate trapping of the particles/biological samples and measure the trapping stiffness, force-extension curve, and other biophysical parameters.
- The vendors should provide a detailed list of places where the similar instrument has been satisfactorily functional for at least 3 years along with the contact details of the

concerned scientist/faculty/officer-in-charge (They should also provide a letter of reference from such users).

- The vendors should have good support and service centers located in India and elaborate on the proposed service modalities for CURAJ.
- Two preventive maintenances for the complete platform should be performed every year during the warranty period.
- All possible applications of the offered system should be clearly stated. Cost should include Installation/commission and initial operator training. On-site application training and application start-up kits/consumables must be supplied by the bidder.
- Cost for three years (ie. 4th to 6 years) on-site comprehensive maintenance contract (CMC) should also be quoted separately.
- Cost of Annual maintenance contract (AMC) for additional 4 years (i.e. 07th to 10th years) subsequent to the CMC period should also be quoted separately.

SPECIFICATIONS:

Lasers	
Laser Module	• 1064 nm laser, 3W or higher, CW, TEM00 Gaussian beam profile (M2 < 1.2) • External 532 nm laser, 3W or higher, CW, TEM00 Gaussian beam profile (M2 < 1.2) • Custom stabilized power supply preferable • <1% intensity fluctuation • **Having sufficient output laser power arriving at the optical trap to trap the µm size beads/biological samples**
Laser Beam Steering Unit	
Piezo - Steering Unit Options	• Standard Single Pivot Point piezo mirror XY-positioning range 50x50 µm or higher or covers full field of view for 60X objective with optional point and trap function - position of traps intuitively controlled by clicking and dragging in the image
Steering Unit Specifications	• Motorised Tunable Splitting Ratio • One Piezo steering to be included. • Thermal noise calibration to exclude errors of trap stiffness estimation due to variation in bead size and sample viscosity • **Having standard trapping stiffness or ~ 0.35 pN/nm for 1 µm beads** • **Having standard force signal stability or 0.3 pN drift over 2 minutes** • Bead movement spectra • Fast response time for steering unit
Detector	
Detector	• Detectors for independent detection of two traps • State-of-the-art back focal plane (BFP) interferometry configuration for position-independent detection • High-sensitive photo-detectors with force resolution of the order of pN • Detection of the particle position in the camera image with upto 400 frame per second and a resolution better than 3nm
Sample Holder	
XYZ nano positioning sample stage	• Sample holder for slides, or custom fluid cells or better slides holder • Motorized XY sample positioning of at least 15mm x 15mm • Additionally, XYZ Piezo nanopositioning sample scanner of at least 100 µm each in X, Y, Z with a position accuracy of the order of nm or better with joystick

	• Experimental versatility for experiments involving surface-attached objects
Workstation: 02 Nos.	
PC Configuration	Processor: 6700 series or above with Core: 4 or Above Freq. : 3.4GHz or above Ram: 32GB Hard Disk :4TB with min 512GB SSD Graphics card: 8GB or better - Firewire A 2+1 - DVD-RW - SMPS Power 1000W or more - 32" TFT display - Gaming keyboard, mouse, - OS with pre-configured genuine software with antivirus or better configuration - heavy duty power extension board (4meter) - liquid cooling system -Wifi connectivity -Warranty : 3 year onsite Or similar/better configuration
Printer	Functions: Print scan and copy Technology: Laser JET with digital display Refillable Print Cartridges First Page Out Black (A4, Ready): As fast as 8 sec or better Duty Cycle (Monthly, A4): Up to 25,000 pages Duplex printing: Automatic Connectivity, Standard: - Hi-Speed USB (compatible with USB 2.0 specifications); 802.11a/b/g/n (2.4/5 GHz) Wi-Fi radio + BLE Network Capabilities: Built-in WiFi 802.11b/g/n (2.4/5GHz) Mobile Printing Capability Certified; Wi-Fi Direct printing Processor Speed: 500 MHz Memory: 64 MB Memory Compatible:Mac and Windows Print Quality Black : Up to 600 x 600 dpi or better configuration
Hardware controller module	
Controller	Hardware control electronics all operated from a single control PC/software or with better option for controller
	Fast trap signal data acquisition rate

Software options	• Fully integrated control of all motorized hardware • Calibration of trap stiffness by thermal noise method • Force and position clamping with closed loop feedback • Scripting language for custom functions • Experimental data processing software • Data acquisition electronics
	Data processing workflow includes overlay functionality of different data channels, customizable analysis routines, (model fitting, step detection etc.)
	Complete Environmental control via software
Optical Microscope	
Standard Optical Microscope	• Inverted Optical Microscope with complete optical elements with port • CCD/CMOS USB 3.0 camera or better camera with high resolution • Suitable trapping objectives compatible with Piezo trap steering. • Extra port to insert an outside laser beam to trapping plane/sample stage • Optics for bright field observations
Microscope Objective	• Water immersion 60x or 100x objective , 100x oil-immersion trapping objective with high NA of 1.4 (Approx.)(for trapping) • Water or oil immersion optics for detection
Vibration Isolation Research Grade Optical table	
Optical Table with active legs and air compressor	• Active 2400 mm x 1200 mm floating anti-vibration optical table with thickness 100- 350 mm for the complete optical tweezers system • Working surface 4 - 5 mm thick 400 series ferromagnetic stainless steel with Surface Flatness ± 0.15 mm over 600 mm square, Mounting Holes M6, Mounting Hole Pattern 25 mm grid or with better configuration • Equipped with Pneumatic Vibration Isolator with Automatic Re-levelling feature along with required compatible accessories such as air-compressor etc. or with better configuration • Total height of the working table should be 800mm-1100mm
Reflective type Phase only Spatial Light Modulator (SLM)	
Liquid crystal based SLM	Wavelength range: 420-1100nm, Display type: Reflective LCOS (Phase only), Resolution: 1920 x 1080 or 1272 x 1024 or better, Pixel pitch:3-12 um, Signal format: HDMI-HDTV Resolution, Input frame rate: 60Hz/180Hz, Fill factor: 90% or better
Lab Refrigerator:	
Lab Refrigerator	Storage Capacity: 650 litre Number Of Doors:1 No. of Baskets/Shelves: 5 or more Dimension: 74x26x31 inch (HxDxW)or more Temperature Range: 0- 10 Degree C Lock: Yes
Laboratory Table with sink	
Laboratory Table with sink	Size (mm): 3000 x 1500 x 800 Weight (About kg): 285 Material top board: BF top board (Material, steel, powder coating finish), surface material / chemical resistant thermal curing Plastic, edge / PP (polypropylene) Body (frame panel): Steel (powder coating finish) Flow: Steel (Depth 600 mm) Sink section: stainless steel (SUS304) Water faucet: 3 port chemical faucet with table and 1 piece Drawer: Steel, Handle / PP (polypropylene) Top board Load tolerance: 200 kg (One span / 1 span)

Freestanding frame with black curtain and internal shelf around optical table to make dark room	
	Size (L x W): 3000 mm x 2400 mm, Structural material: Steel welded design Finish: Black painted finish Top cover: Multiwood Shelf height from breadboard: Minimum 800 mm Top Platform height from breadboard: Minimum 1200 mm Curtain material: Black cloth curtain or with better option Accessories: Electrical power strip, Monitor mounting arm, LED light , Fan with filter
UV lamp for adhesive	
UV lamp for adhesive	power: 40-50W, dimensions: 30/10 cm^2 , weight: 2-5 kg, light angle: 100-120 degrees • UV light power: 250 mW/cm^2 (this high power allows the glue to cure within 5-15 seconds!) , the amount of light emitted: 14,000 mJ/cm, mounting: arm to be mounted on an extension arm / stand In case of temperature higher than 25 degrees Celsius,
Accessories items:	
Digital Optical Power meter (power range: 40uW- 3W, Spectral Range:190- 10600nm), sample preparation kit, silica beads of 500nm, and 1um sizes, Ultraviolet-curing adhesives with refractive index of 1.52-1.56, Gloves (small, medium, large), Pipette sets (0.5uL - 1ml covering all volume ranges), Glass slides (standard and Florescent), Cover slip, Sample preparation table, IR laser detection card, IR laser safety glass, 2 Air Conditioners (each of 2 Tons), lens, mirrors, etc.	
The following items may be quoted optionally:	
Multichannel Laminar Flow Cell	• Temperature range from room temperature 42°C • Sealed dual cover slip design • Up to 5 parallel flow channels fed through tube connectors • Dual syringe pump or pressure driven fluid flow control • Fully integrated software control
Fluorescence Module	For imaging of Fluorescence particle
Any other necessary items can be quoted separately.	

Special Condition:

The vendor should agree for a one-time relocation and re-installation of the system within the CURAJ premises, if needed.