

Tender Ref. No: NABI/02(097)/18-19/N-PUR

Modified Technical Specifications after Pre-Bid Meeting held on 20th Dec' 2018

Specifications for High-Resolution and sensitive Laser Scanning Confocal Microscope for imaging biological samples.

Amendments/Changes mentioned in Yellow Colour

The system should incorporate the latest state-of-the-art technology capable of **High sensitive confocal imaging and spectral imaging** of fixed & Live Biological samples (both animal and plant origin), with high resolution mode capable of resolution enhancement in XYZ directions and amiable to future upgradations. The system should include multichannel Fluorescence imaging with Z-stack, time- lapse including co localization, FRET, FRAP, FCS/FCCS, Anisotropy, Photo activation and conversion experiments. The system should consist of:

1. Five channel fully Motorized Inverted Fluorescence Research Microscope for BF/DIC/FL with dedicated TFT/LED/LCD display for full control of Microscope. Programmable Motorized XY Scanning stage with universal sample holders for slides, Petri dish and other live cell sample holders like 6 well plate, 96 well plate for tile, mosaic/Tile and multipoint imaging, Motorized 6 position DIC nose piece, Motorized BF/PH/DIC Condenser, 6 position motorized FL turret. High precision built in Z-focus drive with step resolution of **20 nm** or better. IR (above 700nm) reflective based (Hardware) focus drift compensation mechanism with software control, Transmitted and Reflected Light illumination with at least 12V/100W LED/halogen illumination for bright field and DIC application and 120W metal halide for fluorescence with PC control and long lifetime of 2000 hours or better. High resolution confocal grade Plan apochromat/plan fluorite objectives corrected for both UV & VIS lines. High NA objectives preferred. 10x/0.40 NA or better with long working distance, 20/25x/**0.75** NA or better (water, oil and glycerol) for live cell imaging, 40x/0.85, 60/63x/1.40 oil, 100x/1.4 oil immersion along with DIC accessories for all objectives. Band pass fluorescent filters for DAPI, GFP, **YFP**, **RFP**, Cy3 and Cy5, CFP, FITC, TRITC/Texas Red etc.
2. Dedicated attachment for converting inverted microscope to upright microscope for deep tissue plant **and animal** samples applications with depth imaging up to 200 micron or better.
3. Automated DIC accessories for all objectives, DIC and fluorescence images should exactly overlap, there should not be any pixel shift.
4. A fast piezo **objective or stage** / galvo focusing stage insert for Z stack imaging with travel range of 100 microns or better.
5. Monochrome cooled CCD camera/**cmos camera**, 2/3" chip with 2 million or better net effective pixel resolution (Firewire based/USBIII) controlled by the same confocal software for multichannel, Z stack, time lapse wide field imaging.
6. An international branded, suitable active anti-vibration table with compressed air damping, bread board table top with threading for the complete microscope system.

7. Laser Point Scanning Confocal detection unit with built-in high sensitive spectral detectors. System should include simultaneous detection and separation of at least 5 fluorophores or more simultaneously. Out of that, 2 or more detectors should be high sensitive GaAsP/HyD or equivalent array. detection channels should have independent gain controls for each channel including high transmission optics.
8. Detection unit should be capable of working in Intensity and Spectral mode Imaging. The detection unit should be built in / separate in respect of scanner unit with best emission signal collection. High sensitive dichroic system with low angle of incidence with high efficient filters for excitation and detection design for better laser separation.
9. Scan resolution of 6K x 6K or more with frame rate of 7-12 fps or higher @512x512 pixels with all PMT & spectral detectors, for all scanning modes like XY, XYZ, XYZT, XYZTλ **without line skipping and interpolation**. Should be able to improve the speed to 110 fps or higher @512x 16.
10. The system should have fully corrected optics for multi-channel Co-localization in X,Y & Z axes with all objectives (10x, 20x/25x,40x, 60/63x & 100x) for **all laser combinations**.
11. All confocal detectors should be able to freely select the fluorescence emission band resolution of at least 5 nm or better for detection and separation of auto-fluorescence.
12. The system should be capable of acquiring images with optical resolution: XY resolution less than 150nm (i.e. resolution should be from 150nm or better like 140, 130nm) & Z resolution less than 400nm (i.e. resolution should be from 400nm or better like 350nm, 300nm) in real time. Depth of imaging should be more than **100 microns in super resolution mode**. Emission filters for entire visible spectrum should be available. All the samples with fluorophores used for confocal system should be compatible for high resolution imaging also.
13. Photon counting mode with high sensitive GaAsP/**SPAD** detector should be included.
14. FCS system for single molecule detection: Based on Minimum 2 channel GaAsP / APD's **/SPAD /TCSPC** detector for FCS/FCCS with high sensitivity and minimum after pulsing. The FCS unit should perform auto and cross correlation measurements in live cells and solution for a wide range of dyes and proteins. The unit should have the facility for elimination/suppression of other excitation laser lines. All laser lines for confocal imaging should be capable of working in FCS/FCCS mode. Dedicated Plan Apo 40x/1.2 water or 63x/1.2 water objective should be offered with the system. FCS measurement software for auto and cross correlation capabilities should be quoted.
15. **Real time/online** ROI scan and bleach with various ROI shapes should be possible for scanning & FRAP experiments. Advanced FRAP and FRET imaging, advanced time series and analysis modules should be included.
16. POL Anisotropy accessories to perform quantitative anisotropy experiments with suitable hardware **as standard**.
17. Maximum scan area should be 18mm or more.

18. PMT based transmitted light detector for DIC imaging.
19. Laser unit with control electronics including multiline Gas laser Ar 458,488,514 nm (laser power 30 mW or more) solid state laser DPSS 561 nm (20 mW or more) Gas laser He Ne 594 nm (2 mW or better), He Ne 633 (5 mW or better) & solid state BDL 405/408nm (30 mW or more), all laser lines should be controlled through AOTF for fast laser switching and attenuation. Separate laser ports for UV/405nm, Vis, IR and additional port for future upgrades is essential. System should have capability to upgrade for Deep UV or Multiphoton laser. Minimum 3 years warranty on all lasers or 10,000 hrs of running whichever is later.
20. Latest 64 bits control computer with Intel Xeon 6 Core Processor or better, DDR RAM 64 or more GB HDD: 4 TB SATA upgradable to 8 TB or better, DVD, SuperMulti SATA +R/RW, Graphics: AT Fire GLV5200/ NVIDIA 4GB or more DH DVI, Gigabit Ethernet, Win 7 or compatible Window's Ultimate 64 bit, USB 2.0, Fire wire. Large 30" or more LED/ TFT monitor.
21. Offline line workstation with license with all features as in the main system should be included.
22. Confocal system control software capable of controlling all motorized functions of microscope, scan head, lasers, AOTF including image acquisition & processing. Saving of all system parameters with the image for repeatable/reproducible imaging, Image acquisition for 3D, 4D, on- line spectral Imaging based on lambda stacks. Line, curved line, frame, Z stack, Time series imaging capabilities , Real ROI bleach for FRAP, Photo-activation/conversion experiments, FRET imaging as well as Quantitative data analysis capability, Standard geometry Measurements like length, areas, angles etc. including intensity measurements, 3D image reconstruction with rendering from a Z-stack image series, Co-localization and histogram analysis with individual parameters, Spectral un-mixing with fingerprinting for separation of overlapping excitation/emission spectra of fluorophores, Image acquisition and processing tools for high resolution images with various modes of visualization tools should be available. FRAP, FRET, Anisotropy, Photo activation and conversion.
23. Third party software **Imaris (Basic + Measurement Pro + Object Tracking)** for generating 3D images along with compatible Workstation.
24. OPERATOR (to be quoted separately)
Trained Operator (MSc and above) for 01 year should be provided by the successful bidders along with the equipment. All statutory rules regarding the manpower should be followed as per GOI norms.

Important terms and conditions:

1. System and accessories should work with 220v @50 HZ.
2. Power requirements for lasers to be specified.
3. Cost should include on site comprehensive warranty for 3 years on the complete system including lasers.
4. The service, maintenance and spares parts support should be given for a period of 10 years from the date of installation, The response time for attending a call should

- be within 24 hours by factory trained service engineer based in Chandigarh region. A letter of commitment should be given in this regard from principal's head office.
5. The principals/local agents are responsible for the complete installation, testing and integration of the system.
 6. Application training should be provided in NABI for three days.
 7. All operating, technical and service manuals with circuit diagrams should be provided along with the system. **Tools and consumables necessary for calibration and alignment like molecular probes test slides, sub micron fluorescence beads should be supplied along with the system.**
 8. Any future upgradation of the system must be done on-site at NABI.
 9. Latest software upgrades should be provided free of cost for 3 years.
 10. Original literature with complete specifications should be given.
 11. Publications, Users list and references should be provided.
 12. **Criteria for selection of the system would be based on the response to all the above points, suitability and requirements of various research projects of NABI.**

All other Terms and Conditions of the tender remain unchanged

Stores and Purchase Officer