REQUEST FOR PROPOSAL (RFP)

1. INVITATION

The National Center for Research in Energy and Materials – **CNPEM** invites your company to participate in this Request for Proposal for: 1 unit of CRYOCONFOCAL MICROSCOPE, according to the attached technical specifications.

2. CONTEXT

The National Center for Research in Energy and Materials (**CNPEM**) is a private non-profit organization supervised by the Ministry of Science, Technology, and Innovation (**MCTI**). Located in Campinas, SP, CNPEM houses four world-class laboratories open to the scientific and business community:

- **National Synchrotron Light Laboratory (LNLS)**, operating the only synchrotron light source in Latin America – the new Brazilian fourth-generation accelerator, Sirius – used for analysis of various organic and inorganic materials;
- **National Biosciences Laboratory (LNBio)**, conducting cutting-edge research in the life sciences, focusing on biotechnology and pharmaceuticals;
- **National Biorenewables Laboratory (LNBR)**, dedicated to biotechnological solutions for the sustainable development of advanced biofuels, biochemicals, and biomaterials using Brazilian biomass and biodiversity;
- **National Nanotechnology Laboratory (LNNano)**, performing research on advanced materials with high economic potential for the country.
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CNPEM promotes a research and innovation environment in the areas of Health, Energy and Renewable Materials, Agricultural and Environmental Sciences, and Quantum Technologies. Since 2022, with the support of the Ministry of Education (**MEC**), CNPEM also offers an interdisciplinary higher education program through the **ILUM School of Sciences**, focusing on Science, Technology, and Innovation. This program provides full-time, free education fully immersed in CNPEM's research environment.
For more information, visit: www.cnpem.br

3. GENERAL INFORMATION

Proposals and relevant documentation should be sent via e-mail to the purchasing contact:

Name: Danilo Carlos de Sousa
E-mail: danilo.sousa@cnpem.br

Technical evaluation contact:
Name: João Marcos de Lima Faria
E-mail: joao.faria@lnnano.cnpem.br

4. SCHEDULE

Date	Event
09/11/2026	RFP Issuance
26/11/2026	Proposal submission deadline
27/11/2026-30/11/2026	Proposal evaluation period
01/12/2026	Expected issuance of purchase order

5. RELATED DOCUMENTS

The following attachments are integral parts of this RFP (previously sent to participants):

- List of items
- CNPEM website publication

6. PROCEDURES

PRICE PROPOSAL REQUIREMENTS

- Commercial Proposals must be submitted separately;
- Full identification and address of the participant;
- Price table with unit and total values, expressed numerically and in words, excluding financial charges or adjustments;
- Minimum payment term: 30 days after issuance of the invoice or CAD;
- Delivery timeline for the items;
- Delivery terms (Incoterms);
- Proposal validity: 30 days from the submission date.

EVALUATION CRITERIA

- Document review;
- Commercial evaluation – price, payment terms, delivery time, warranty.

INVOICING AND PAYMENT

- Items invoices: issued according to Purchase Order milestones; payment as agreed.

7. ADDITIONAL INFORMATION

Failure to comply with the requirements of this document exempts CNPEM from any penalties and may lead to the rejection of materials or services in cases of discrepancies or non-compliance. Invoices must contain banking information and be sent to comex@cnpem.br at least 28 days prior to the due date.

8. BILLING AND DELIVERY INFORMATION

CENTRO NACIONAL DE PESQUISA EM ENERGIA E MATERIAIS – CNPEM

Rua Giuseppe Máximo Scolfaro, 10.000 – Polo II de Alta Tecnologia
CEP: 13083-100 – Campinas/SP, Brazil
CNPJ: 01.576.817/0001-75

- Include the Purchase Order or Contract number on the invoice;
- E-mail for invoice submission: comex@cnpem.br
- Materials receiving hours:
    - 08:30 AM to 11:30 AM
    - 01:00 PM to 04:30 PM

Campinas, November 17, 2026

TECHNICAL SPECIFICATION FOR THE ACQUISITION OF A CRYO-CONFOCAL MICROSCOPE

1. Scope

Acquisition of an integrated high-sensitivity confocal fluorescence microscopy system intended for the acquisition of two-dimensional and three-dimensional images of biological samples preserved in a vitrified state and for the performance of correlative microscopy experiments under cryogenic conditions, including correlative light and electron microscopy applications, referred to as Cryo-CLEM.

The system shall enable the localization, documentation, analysis, and spatial correlation of cellular structures, organelles, macromolecular complexes, fluorescent markers, and other targets of interest in vitrified samples, enabling the identification of regions of interest and the generation of positional information for subsequent electron microscopy steps, including Cryo-TEM, Cryo-SEM, cryo-FIB, and/or cryo-PFIB, according to the experimental workflow adopted.

The configuration shall be suitable for the acquisition of fluorescence images under low-light-intensity conditions, with high collection and detection efficiency, low noise, optical sectioning, volumetric acquisition, multichannel operation, and features for reducing sample exposure, preserving, to the extent technically possible, its structural integrity, vitrification, and fluorophore emission.

2. Minimum System Requirements

The system shall consist, at a minimum, of:

- motorized optical microscope suitable for fluorescence microscopy;
- laser scanning confocal module;
- excitation sources and optical components required for wavelength selection and routing;
- fluorescence detection system with configurable spectral selection;
- dedicated cryogenic system for maintaining and acquiring images of vitrified samples;
- objective lens or set of objective lenses compatible with cryogenic operation;
- system for transferring and handling samples under cryogenic conditions;
- dedicated computer workstation;
- software for equipment control and image acquisition, processing, visualization, analysis, and correlation;
- tools for localization and transfer of coordinates of regions of interest;
- components, licenses, devices, cables, interfaces, accessories, and other items required for the installation and full operation of the system.

The system shall enable multicolor confocal microscopy experiments, acquisition of image stacks along the Z-axis, mosaic acquisition, navigation across

multiple positions, three-dimensional reconstruction, and correlation of information obtained by fluorescence microscopy with images or coordinates originating from other microscopy modalities.

Different optical, electronic, and computational architectures shall be accepted, including solutions based on discrete lasers, continuous-spectrum or supercontinuum lasers, point, array, or multielement detectors, and optical or computational resolution-enhancement methods, provided that the offered configuration meets the minimum performance, integration, sample safety, and Cryo-CLEM application compatibility requirements defined in this specification. All components mentioned in this document regarding integration with Cryo-PFIB shall consider compatibility with the Thermo Scientific Hydra-Bio® Cryo-PFIB electron microscope.

The supply shall include all components required for installation, calibration, performance demonstration, training, sample transfer, and routine operation of the equipment. The subsequent acquisition of any component essential for meeting the mandatory functionalities described in this specification shall not be permitted.

2.1 Base Microscope

The system shall consist, at a minimum, of:

- motorized optical microscope suitable for fluorescence microscopy;
- laser scanning confocal module;
- excitation sources and optical components required for wavelength selection and routing;
- fluorescence detection system with configurable spectral selection;
- dedicated cryogenic system for maintaining and acquiring images of vitrified samples;
- objective lens or set of objective lenses compatible with cryogenic operation;
- system for transferring and handling samples under cryogenic conditions;
- dedicated computer workstation;
- software for equipment control and image acquisition, processing, visualization, analysis, and correlation;
- tools for localization and transfer of coordinates of regions of interest;
- components, licenses, devices, cables, interfaces, accessories, and other items required for the installation and full operation of the system.

2.2 Confocal System

The equipment shall have a laser scanning confocal system based on point-by-point scanning, line scanning, parallel detection, or equivalent technology, provided that it is capable of performing out-of-focus light rejection, optical sectioning, and three-dimensional acquisition of fluorescence images with performance compatible with Cryo-CLEM applications.

The system shall provide, at a minimum:

- acquisition of confocal images with a matrix resolution of up to 8192 × 8192 pixels, or higher;
- the possibility of using lower user-selectable resolutions to optimize speed, field of view, spatial sampling, and signal-to-noise ratio;
- continuous or selectable adjustment of scanning zoom, without the need to replace the objective lens;
- independent control of the excitation and detection parameters of each channel;
- acquisition of two or more fluorescence channels simultaneously, sequentially, or through a combination of these modes;
- multidimensional acquisition in XY, XYZ, XYT, XYZT, spectral, multiple-position, mosaic, and combinations of these modes;
- acquisition of image stacks along the Z-axis, with user-defined interval, axial extent, and number of planes;
- electronic adjustment of the confocal pinhole, preferably independently for each channel, or a functionally equivalent optical feature for controlling optical-section thickness;
- operation with unidirectional and bidirectional scanning, when supported by the equipment architecture;
- adjustment of scanning speed, pixel dwell time, line and/or frame averaging, and number of integrations;
- adjustment of pixel size and spatial sampling, enabling configuration according to appropriate sampling criteria, including the Nyquist criterion;
- software-configurable selection of spectral detection bands or windows;
- sequential channel acquisition to reduce cross-excitation, spectral bleed-through, and other spectral interferences;
- simultaneous channel acquisition when permitted by the combination of excitation sources, detectors, and spectral windows;
- automated and integrated control of excitation sources, optical path, pinhole, detectors, stage, focus, and other motorized components;
- storage of instrumental parameters and metadata associated with the acquisition;
- export of images and their respective metadata in a proprietary format and in at least one open or widely used scientific microscopy format, such as TIFF, OME-TIFF, or equivalent;
- compatibility with image acquisition from samples with low fluorescence intensity, with the possibility of reducing excitation power and optimizing detection efficiency;
- features for correcting, compensating for, or tracking focus and position drift.

2.3 Excitation Sources

The system shall have laser excitation sources suitable for multicolor confocal microscopy, with wavelengths distributed across the spectrum required for excitation of the fluorophores of interest.

Configurations based on the following shall be accepted:

- lasers with discrete lines;
- tunable lasers;
- white-light, continuous-spectrum, or supercontinuum lasers;
- a combination of these technologies;
- other laser sources with equivalent performance, provided that they are compatible with the confocal system and the specified applications.

The offered configuration shall meet, at a minimum, the following requirements:

- include, at a minimum, wavelengths or ranges functionally equivalent to 405 nm, 488 nm, 561 nm, and 633 or 640 nm;
- allow the inclusion or selection of additional wavelengths between approximately 410 and 675 nm;
- allow electronic activation and deactivation of the lines or wavelengths;
- allow individual adjustment of the power or intensity of each excitation line;
- allow the use of two or more excitation lines in the same experiment, simultaneously, sequentially, or through a combination of these modes;
- allow independent association among excitation lines, spectral detection windows, and acquisition channels;
- allow the configuration of multicolor experiments through software;
- allow sequential acquisition by line, frame, plane, series, or equivalent mode, when required to reduce interference between fluorophores;
- have a system for modulation, selection, and combination of the excitation lines integrated into the equipment;
- provide sufficient power and stability for the intended applications, including confocal acquisition, three-dimensional acquisition, and mosaics;
- allow the reduction of power at the sample to minimize saturation and photodamage;
- allow the wavelengths used and their respective power or transmission settings to be stored in the image metadata.

For systems based on discrete lines, electronic selection among the available lines shall be accepted, and it shall not be mandatory for all intermediate wavelengths to be continuously tunable.

For systems based on continuous-spectrum, supercontinuum, or White Light Lasers, it shall be possible to electronically select wavelengths within the operating range of the system and individually adjust their intensity.

2.4 Detectors

The system shall have high-sensitivity fluorescence detectors, including:

- High quantum efficiency;
- Photon-counting mode;
- Spectral detection range covering 410–675 nm;
- A minimum of three independent and simultaneous detection channels.

2.5 Enhanced Resolution

The system shall have built-in spatial-resolution-enhancement technology applied to confocal data generated by the equipment itself, including:

- Adaptive reconstruction during acquisition, with parameters adjusted to the local properties of the image, region by region;
- Improvement of lateral and axial resolution without compromising the temporal resolution of the acquisition workflow;
- Lateral resolution equal to or better than 120 nm;
- Acquisition and processing integrated into the system.

2.6 Cryogenic System and Sample Preservation

The equipment shall include a dedicated cryogenic stage or holder compatible with vitrified samples, including:

- Operation at a temperature close to −180°C;
- Thermal stability that maintains vitrification during prolonged acquisitions;
- Protection against ice contamination originating from atmospheric moisture;
- Safe sample loading and transfer;
- Compatibility with grids and autogrids for electron microscopy;
- Reservoir, replenishment, and supply control for liquid nitrogen;
- Temperature measurement and monitoring during acquisition.

2.7 Motorized Stage

The stage shall have:

- Motorized control of the X and Y axes;
- Reproducible positioning;
- Compatibility with Cryo-CLEM applications;
- Automated navigation between regions of interest;
- Mosaic acquisition (tiling) and multiple-position acquisition.

2.8 Objective Lenses

The system shall include:

- A low-magnification objective lens for sample localization;
- An intermediate objective lens for the acquisition of large areas;
- A dedicated high-numerical-aperture (NA) objective lens for cryogenic operation, with a working distance compatible with the window and cryogenic stage;
- Low-thermal-conductivity construction in the front portion of the cryogenic objective lens, with a thermally insulated tip and a design specifically intended for the Cryo-CLEM workflow.

2.9 Camera

A scientific camera shall be provided for documentation and navigation, including:

- CMOS or sCMOS sensor;
- Minimum resolution of 7 MP or equivalent;
- High sensitivity under low-light conditions;
- Interface integrated with the system acquisition software.

2.10 Software, Correlative Workflow, and 3D Targeting

The system shall include perpetual software licenses for acquisition, processing, analysis, and a guided correlative workflow, and shall include:

- Full control of the microscope;
- Capability for multichannel acquisition, time series, Z-stacks, and automatic mosaics;
- Automatic focus correction;
- Three-dimensional reconstruction and visualization capability, or integration with software of equivalent capability;
- Quantitative measurements and segmentation;
- Artificial-intelligence-assisted tools for segmentation and analysis, or integration with software of equivalent capability;
- Three-dimensional target localization;
- Recording and export of coordinates and markers in an open format for import into the electron microscopy, cryo-FIB, or cryo-PFIB stage;
- Guided workflow for correlation between modalities, preserving sample position and orientation information.

2.12 Dual-Mode Operation

The system shall allow cryogenic and room-temperature operation on the same platform, with the configuration and accessories required for safe switching between the modalities, when applicable to the routine of the multiuser laboratory.

2.13 Transfer Compatibility with the Existing Cryo-FIB

The system shall be compatible with the workflow of the Thermo Scientific Hydra-Bio® Cryo-FIB/Cryo-PFIB system, including:

- Compatibility of the sample holder or transfer cartridge between the cryo-confocal microscope and the cryo-FIB/cryo-PFIB;
- Transfer with the fewest possible handling steps;
- Maintenance of the sample, preferably, in the same cartridge, without reclipping between instruments;
- Provision of a shuttle or transfer kit compatible with the shuttle of the cryo-confocal microscope itself and with the installed cryo-FIB/cryo-PFIB infrastructure.

2.14 Computing

A professional workstation shall be provided, approved or validated by the microscope manufacturer for integrated system operation, image acquisition, and execution of the software included in the proposal.

The workstation shall have, at a minimum:

- an Intel Xeon W, AMD Ryzen Threadripper Pro, or equivalent processor, with at least 16 physical cores and performance compatible with the acquisition, processing, and analysis of multidimensional images;
- 256 GB of DDR5 RDIMM ECC RAM, or equivalent technology, installed in a configuration optimized for the processor's memory channels;
- the possibility of expanding the RAM to at least 512 GB, preferably without complete replacement of the supplied modules;
- one professional NVIDIA RTX 5000 Ada GPU with 32 GB, or an equivalent or superior model, provided that it is approved or validated for the supplied software;
- support for GPU-accelerated processing, including CUDA or equivalent technology used by the acquisition, reconstruction, deconvolution, 3D visualization, segmentation, and artificial intelligence software;
- an NVMe SSD with a capacity of at least 2 TB, dedicated to the operating system and software installation;
- an additional NVMe SSD with a capacity of at least 4 TB, dedicated to temporary data, cache, and image processing;
- a local storage system consisting of at least two 12 TB SATA hard drives configured in RAID 1, providing a minimum nominal usable capacity of 12 TB;
- a hardware RAID controller or an integrated solution with equivalent reliability and performance;
- an Ethernet network interface of at least 1 Gb/s, with an additional 10 Gb/s interface being desirable for the transfer of large datasets;
- USB ports and other interfaces in sufficient quantity for connecting the microscope, controllers, storage devices, accessories, peripherals, and transfer systems;
- a power supply sized for the complete configuration and with capacity for future expansion of memory, storage, and GPU;
- keyboard and mouse;
- a professional monitor of at least 27 inches, with a minimum resolution of 2560 × 1440 pixels, preferably 4K, suitable for the visualization of scientific images. Other monitor models shall be accepted, provided that they are part of non-separable sets;
- a 64-bit Windows 11 Professional for Workstations operating system, or the version required by the system manufacturer.

The GPU and its drivers shall be compatible with and approved by the microscope supplier for all software offered. If the software requires a different configuration, the supplier shall provide hardware with equal or superior performance.

2.15 Vibration Control

The system shall include:

- Anti-vibration table or equivalent system;
- Passive or active damping;
- Capability for operation with the cryogenic platform installed.

3. Installation, Acceptance, and Training

The supplier shall provide:

- Complete installation of the equipment and all accessories.
- Initial calibration;
- Acceptance tests, including verification of the cryogenic, confocal, and transfer functions;
- Operational training for users by a qualified specialist;
- Application training for Cryo-CLEM experiments, 3D targeting, and cryo-FIB/cryo-PFIB transfer by a qualified specialist;
- Technical documentation in digital format.

4. Warranty and Support

The equipment shall have:

- Minimum warranty of 12 months;
- Specialized technical service in Brazil;
- Availability of software updates during the warranty period;
- Remote and on-site support, when required.

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Documento assinado digitalmente
JOAO MARCOS DE LIMA FARIA
Data: 17/11/2026 11:18:08-0300
Verifique em https://validar.iti.gov.br

João Marcos de Lima Faria
Technological Development Specialist
Cryo-Electron Microscopy - CME