SPECIFIC TECHNICAL SPECIFICATIONS FOR THE SUPPLY CONTRACT FOR THE "PURCHASE OF AN OPTICAL FREQUENCY COMB"

0. BACKGROUND OR CONTEXT

By Order of 3 September 2025 of the Presidency of the State Research Agency (Agencia Estatal de Investigación), the 2025 call for applications was approved under the procedure for awarding grants for the acquisition of scientific and technical equipment, within the State Subprogramme for Institutional Strengthening of the State Programme for Research and Experimental Development, in the framework of the State Plan for Scientific, Technical and Innovation Research 2024-2027 (National Grants Database identifier: 844319).

Within the framework of this call, the EHU submitted an application for the action entitled "Self-Referenced Optical Frequency Comb with Extension into the Visible (500nm-1000nm)", with reference EQC2025-009873-P, in which Pablo Acedo Gallardo was named as the scientific and technical lead.

On 15 April 2026 the provisional resolution of this call was published, proposing the award of the grant requested for the aforementioned action which, from a total budget of EUR 477,250.00, received a grant of EUR 102,680.00.

These specifications set out the specific technical requirements of the supply contract associated with this action.

1. PURPOSE

The purpose of these specifications is to define the technical characteristics governing the provision consisting of the supply of an optical frequency comb.

2. TECHNICAL CHARACTERISTICS TO BE MET BY THE GOODS TO BE SUPPLIED

2.1. TECHNICAL REQUIREMENTS

Optical frequency comb (seed):

- Integrated reference laser.
- Self-referenced system: stabilized carrier-envelope offset frequency (f-CEO), which also allows tuning of the absolute position of the comb lines.
- Central (optical) frequency: 1550 nm (±50 nm).
- Minimum number of output ports: 6
- Minimum repetition rate (frep): 100 MHz
- Capability to frequency-tune a single comb line within the wavelength range of interest, by at least an amount equal to the repetition rate.
- Capability to be referenced to an external Rb/Cs clock (10 MHz signal).
- Default linewidth, with the comb locked to the included optical reference (on all comb lines): < 150 Hz.
- Linewidth (locked to a sub-Hz optical reference): < 1 Hz (1 s integration time) for all frequencies and all wavelength extensions.
- Frequency stability: ≤ 5×10^{-17} at 1 s (modified Allan deviation, MDEV, documented by the manufacturer).

Supercontinuum generation:

- The system must provide the capability and scalability to optically stabilize lasers over a minimum range of 670 nm to 1700 nm.

- Minimum number of installed channels: 4. Each channel must include the capability to provide beat-note detection, as well as division of that signal for counting, locking and monitoring.
- Required wavelengths: 1270 nm, 960 nm, 780 nm and 760 nm.
- Possibility of future system extension up to 8 channels (minimum).

Laser synchronization and locking electronics:

- Complete system to simultaneously control and lock at least 4 external laser systems at the selected wavelengths, including generation of the error/correction signal required for locking.
- Compatibility with the main laser controller suppliers on the market (TOPTICA DLC-Pro or similar).

Wavelength meter (wavemeter):

- Minimum range 600 nm to 1700 nm.
- Accuracy: < frep/2 .
- Internal calibration source included.

System integration:

- Fully modular system housed in a 19" rack.
- Control computer and operating software included.
- Remote control and programming interface (e.g. Ethernet and/or USB).
- Distribution of the 10 MHz RF reference and input for an external 10 MHz reference included.
- Any cooling system required by the equipment must be self-contained (closed loop), with no need for connection to the building water supply.

3. OTHER ASPECTS RELATING TO THE SCOPE OF THE CONTRACT

- Commercial warranty: one year minimum.
- Technical support during the warranty period: all travel, materials, labour and other costs that may arise during the warranty period as a result of faults or defects in the equipment supplied shall be borne by the contractor.
- Training: one-day (eight-hour) seminar for laboratory staff upon delivery of the equipment.
- Transport: included in the contract price.
- Removal of packaging.

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