ICFO

SPECIFICATION SHEET

SUPPLY, INSTALLATION AND COMMISSIONING OF AN "ULTRA-LOW NOISE AND ULTRA-STABLE VOLTAGE SOURCE WITH CURRENT MEASUREMENT" FOR ICFO'S LABORATORY , THROUGH AN OPEN PROCEDURE

NÚMERO D'EXPEDIENT: 2023.SU.015

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CLAUSE 1. Object of the contract

The purpose of this contract is the supply, installation and commissioning of an " ULTRA-LOW NOISE AND ULTRA-STABLE VOLTAGE SOURCE WITH CURRENT MEASUREMENT " for ICFO' laboratory.

The types of items supplied are linked to the CPV (Common Public Procurement Vocabulary), **38000000-5** Laboratory, optical and precision equipment (except glasses).

CLAUSE 2. Needs to satisfy

Research lines where the QNOE group is involved require a multi-channel and multi-functional voltage source and current measurement unit that is ultra-stable and has ultra-low noise with high-precision control. The unit will be used to supply multiple gate and source/drain DC/AC voltages to the quantum devices, AC voltage to modulate the piezo stage, and multiple AC voltage to modulate the capacitive sensors. It is also necessary to communicate with other instruments like the lock-in amplifier with the trigger function. At the same time, current on each channel will be monitored. To perform very sensitive photocurrent and photoconductivity measurement, a very clean voltage source will be needed to minimize the noise level of the signal. In accordance, we will acquire an electronic unit that can integrate voltage source and current measurement, both with low noise and high resolution.

CLAUSE 3. Technical specifications

The voltage source and current measurement unit needs to fulfil at least the next several features:

- The unit shall be equipped with at least 20 individual DAC channels.
- There shall be arbitrary waveform generator on each channel.
- There shall be triggering and synchronization functions between channels with sub-microsecond precision.
- The noise level of the voltage source shall be well below 10 nV/√Hz near 100 Hz.
- Each channel shall have the simultaneous current measurement with a resolution of a few tens of pA.
- The output sampling rate shall be at least 1 MHz.
- It shall be able to trigger external instruments and be triggered externally. The trigger shall be galvanically isolated.

CLAUSE 4. Shipping, transport

Shipping and transport to the laboratories of Prof. Frank Koppens at ICFO must be included. DAP incoterms will apply.

CLAUSE 5. Warranty

One-year full warranty on all components, starting at system acceptance. The warranty will include the replacement of any faulty or damaged part(s) during the normal use of the system, no matter the manufacturer of the component(s). It will cover any cost related with the disassembly, transportation, reparation and re-assembly of the damaged component(s), including all travelling and living costs of the required service engineer(s). An on-site repair, or a justified alternative to reduce the system down time to the minimum, will always be the first service

option. A team of properly qualified and skilled service engineers will have to be available. It will also cover the costs and the maintenance related to the machine move and installation on the new building.

CLAUSE 6. CE Marking

CLAUSE 7. Target price

32.000,00 EUR (VAT excluded).

CLAUSE 8. Delivery time

8.1. Delivery time maximum of six weeks:

- Delivery time is defined as the time elapsed since the signature of the awarding document until the system delivery at ICFO facilities. It includes the manufacture of the system, the acceptance test at company's premises and the transportation.

Castelldefels, 25th May, 2023

Prof. Dr. Frank Koppens
GL Quantum Nano-Optoelectronics