

PLEC DE PRESCRIPCIONS TÈCNIQUES

SUPPLY, INSTALLATION AND STARTING-UP OF A “TABLE-TOP LOW-FIELD NMR SPECTROMETER” FOR AN ICFO LABORATORY

FILE NUMBER: 2025.SU.031

Contents

CLAUSE 1. Object of the contract.....	1
CLAUSE 2. Needs to be satisfied.....	1
CLAUSE 3. Technical specifications	1
CLAUSE 4. Additional mandatory requirements (in case the offer does not fulfil these requirements, it will be automatically excluded from the tender).....	1
CLAUSE 5. Operation	2
CLAUSE 6. Transportation, installation and start-up.....	2
CLAUSE 7. Warranty and Follow-on Support	2
CLAUSE 8. CE MARKING.....	2
CLAUSE 9. Delivery and Installation Time	2
CLAUSE 10. Target Price	3

CLAUSE 1. Object of the contract

A bench-top nuclear magnetic resonance spectrometer operating in the range of 1.4 to 2.5 T (or 14 to 25 MHz ^{13}C nuclear Larmor frequency for detection of optically polarized ^{13}C nuclear spins. Dual $^1\text{H}/^{13}\text{C}$ RF probe needed.

CLAUSE 2. Needs to be satisfied

ICFO does not have an NMR spectrometer. One is required to meet the technical specifications given in Clause 3.

The system will enable ICFO's Atomic Quantum Optics research group to perform high-resolution bench-top NMR measurements with full experimental flexibility as proposed in funded research projects (supporting advanced pulse-sequence development, dual-nucleus operation, secure remote access) as well as support other group projects in the longer term.

CLAUSE 3. Technical specifications

- Magnetic field
 - Fixed field: 1.4 to 2.5 T.
 - DC stability: < 1 ppm drift / 5 minutes.
 - Temperature stability: <0.01 °C.
- Magnetic field homogeneity, quantified by ^1H NMR spectral resolution / 5 mm sample diameter
 - <0.5 Hz full width at 50% of peak height.
 - <10 Hz full width at 0.5% of peak height.
- Radiofrequency
 - Detection of both ^1H and ^{13}C nuclear Larmor frequencies with a dual-tuned RF pickup coil or set of pickup coils.
 - RF pulse sequences on ^1H and ^{13}C resonances, including simultaneous pulses.
 - Signal acquisition dead time: <1 ms.
- Programming interface: low-level pulse sequence control including (1) edits of system pulse programs and (2) user-defined pulses.
- Power
 - EU mains: 240 V / 50 Hz.
 - Protection of the system's electronics from damage in the event of power cuts / UPS loss must be included.

CLAUSE 4. Additional mandatory requirements (in case the offer does not fulfil these requirements, it will be automatically excluded from the tender)

- The magnet must have a flat pole geometry, as opposed to a concentric geometry such as a Halbach cylinder.

- The field stability must be maintained even in the absence of the sample, such as by an external deuterium lock.
- The stray field of the magnet must not exceed 0.1 mT at 1 m distance from center.
- The radiofrequency pickup circuit must be accessible for mechanical modification by the user.

CLAUSE 5. Operation

The spectrometer should be placed on a lab bench top and able to be operated from a nearby computer, AND remotely via secured connection over ICFO's IT network. For the case of remote operation, ethernet connection is required.

CLAUSE 6. Transportation, installation and start-up

5.1. The proposal will include transportation to ICFO's facilities (Atomic Quantum Optics Group laboratory) including insurance and all export/import and customs duties. **DAP incoterm will apply.**

5.2. The instrument will be placed in the selected location by ICFO. Contract winner will cover all costs, organization and coordination of machine placement, including any required specialized equipment or vehicle, and any required component disassembly and reassembly for system unloading and transportation inside the building.

5.3. Onsite system installation and training to ICFO personnel included.

CLAUSE 7. Warranty and Follow-on Support

- **Minimum 1-year Full Warranty** on all parts and components of the system irrespective of the manufacturer. The warranty will include the replacement of any faulty or damaged part(s) during 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.
- **Additional years of warranty will be evaluated positively as stated in the Annex núm. 2.**

CLAUSE 8. CE MARKING

CE MARKING is required.

CLAUSE 9. Delivery and Installation Time

The system must be delivered and installed at ICFO within a maximum period of **20 weeks** from the PO issued by ICFO.

Delivery time is defined as the time elapsed since the PO until the system delivery at ICFO facilities. It includes the manufacture of the system, the transportation, the installation and the acceptance test at ICFO's premises.

CLAUSE 10. Target Price

95,000 EUR (VAT excluded).

Castelldefels, on the date of its digital signature

Prof. Dr. Morgan Mitchell
GL of Atomic Quantum Optics