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Award

sSNOM Upgrade for University of Manchester

National Physical Laboratory

F15: Voluntary ex ante transparency notice
Notice identifier: 2024/S 000-021633
Procurement identifier (OCID): ocds-h6vhtk-047d59
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Section I: Contracting authority/entity

I.1) Name and addresses

National Physical Laboratory

Hampton Road

Teddington

TW11 0LW

Email

nina.heath@npl.co.uk

Country

United Kingdom

Region code

UK - United Kingdom

Internet address(es)

Main address

www.npl.co.uk

I.4) Type of the contracting authority

Body governed by public law

I.5) Main activity

Other activity

Research

Section II: Object

II.1) Scope of the procurement

II.1.1) Title

sSNOM Upgrade for University of Manchester

II.1.2) Main CPV code

- 38000000 - Laboratory, optical and precision equipments (excl. glasses)

II.1.3) Type of contract

Supplies

II.1.4) Short description

Upgrade enabling time-resolved pump-probe spectroscopy for cryogenic THz-TDS near-field measurements. The pump laser must be synchronized with the existing THz-TDS spectroscopy and cryogenic near-field systems. The upgrade includes a laser amplifier unit with free-space coupled optical output at 780nm, 100MHz rep rate, pulse energy >1.3nJ, >140mW output power, and customized fiber patch cord for temporal overlap of pump-probe pulses. Additionally, a transmission module enables static pump-probe measurements in transmission, where the sample is pumped via a diffraction-limited beam from the bottom and probed by amplitude- & phase-resolved near-field measurements (pseudo-heterodyne detection) from the top.

II.1.6) Information about lots

This contract is divided into lots: No

II.1.7) Total value of the procurement (excluding VAT)

Value excluding VAT: 262,370 EUR

II.2) Description

II.2.3) Place of performance

NUTS codes

- UK - United Kingdom

Main site or place of performance

Photon Science Institute, University of Manchester, M13 9PL

II.2.4) Description of the procurement

Upgrade for cryo-neaSCOPE+xs s-SNOM system can only be provided by the base system’s manufacturer – attocube systems AG.

Needs and requirements include:

1. Ultra-fast spectroscopy software module for THz-TDS

• Enables pump-probe spectroscopy for THz-TDS in neaSCAN

• Provides software control of all delays and components for ready-to-use results

• Allows acquisition of time-resolved spectra with down to 40 fs temporal resolution

2. Synchronized Transmission-Mode Detection Module

• Enables bottom-side sample illumination in transmission-mode with broadband parabolic mirror (NA=0.44)

• Enables simultaneous detection of optical near-field amplitude & phase

• Motorized parabolic mirror for beam-alignment

• Stationary focal point with respect to AFM-tip

• Variable illumination spot size (ca. 2?m - 100?m)

• Suitable for plane-wave illumination

• Exchangeable beam-splitter mount

• Supports stationary focal point with respect to sample position (bottom-side illumination synchronized with sample scanner)

• Support AFM scan-speed: up to 20 ?m/s @ highest spatial resolution

3. Software Development Kit for neaSCAN

4. THz Pump-Probe operation

• additional delay line & synchronized software control for pump probe

• amplifier unit with free-space coupled optical output at 780nm with amplifier unit mounted on optical table next to neaSNOM microscope

• 100MHz rep rate, pulse energy >1.3nJ, >140mW output power

• Customized fiber patch cord for temporal overlap of pump-probe pulses

II.2.5) Award criteria

Cost criterion - Name: Technical / Weighting: 90%

Cost criterion - Name: Commercial / Weighting: 10%

II.2.11) Information about options

Options: No

II.2.13) Information about European Union Funds

The procurement is related to a project and/or programme financed by European Union funds: No

Section IV. Procedure

IV.1) Description

IV.1.1) Type of procedure

Award of a contract without prior publication of a call for competition in the cases listed below

- The procurement falls outside the scope of application of the regulations

Explanation:

Attocube systems AG is the only company worldwide, who manufactures a scattering-type near-field optical microscope (our pre-upgrade system) that enables simultaneous background-free imaging and spectroscopy on nanometre length scales in the visible-IR-THz range. Their exclusive design works with the following patents:

• Patented parabolic mirror design for focusing and collection of light

• Patented dual-port design to allow two beams of light to be focused on the atomic force microscope (AFM) tip for nanoscale imaging and spectroscopy

• Patented signal processing for optical background suppression

• Patented pseudo-heterodyne detection (PsHet) technology for background suppression

• Patented interferometric design (nano-FTIR) for background-free optical detection technology and simultaneous detection of optical amplitude and phase and hyperspectral imaging

• Patented high speed holography for multispectral imaging

• Patented phase shifting detection to extract relative phase

These patents and the exclusive design have enabled the neaSCOPE system to conduct amplitude and phase-resolved vector field, reflection, and absorption mapping with nanoscale spatial resolution. It is currently the only solution provider on the market that enables dual-port s-SNOM operation combined with a high NA parabolic mirror, which is essential for low SNR THz TDS and pump-probe measurements.

In particular, attocube systems AG is the only company who can upgrade the existing cryogenic s-SNOM system (cryo-neaSCOPE) based at University of Manchester to perform nanoscale THz-TDS and pump-probe imaging and spectroscopy at low

temperature.

Therefore, the same manufacture of the pre-upgraded s-SNOM system is required to ensure:

• All upgrade subsystems must be compatible with the existing microscope controls (both in hardware and software), while still being amplitude- & phase-resolved and background-free.

• Pump laser must be electronically synchronized with the existing cryogenic THz-TDS spectroscopy system

• Excitation wavelength must be compatible with optical windows in the cold shroud of the existing cryo-neaSCOPE system

IV.1.8) Information about the Government Procurement Agreement (GPA)

The procurement is covered by the Government Procurement Agreement: Yes

Section V. Award of contract/concession

A contract/lot is awarded: Yes

V.2) Award of contract/concession

V.2.1) Date of conclusion of the contract

15 July 2024

V.2.2) Information about tenders

The contract has been awarded to a group of economic operators: No

V.2.3) Name and address of the contractor/concessionaire

attocube system AG

Eglfinger Weg 2,

Haar

85540

Country

Germany

NUTS code

- DE - Germany

The contractor/concessionaire is an SME

Yes

V.2.4) Information on value of contract/lot/concession (excluding VAT)

Total value of the contract/lot/concession: 262,370 EUR

V.2.5) Information about subcontracting

The contract/lot/concession is likely to be subcontracted

Section VI. Complementary information

VI.4) Procedures for review

VI.4.1) Review body

NPL Management Ltd

Hampton Road

Teddington

TW11 0LW

Country

United Kingdom

VI.4.2) Body responsible for mediation procedures

NPL Management Ltd

Hampton Road

Teddington

TW11 0LW

Country

United Kingdom