

Portugal-Braga: Transmission electron microscope
OJ S 234/2014 04/12/2014
Contract award notice
Supplies

Directive 2004/18/EC

Section I: Contracting authority

I.1. Name and addresses

Official name: INL, International Iberian Nanotechnology Laboratory
Postal address: Avenida Mestre José Veiga
Town: Braga
Postal code: 4715 330
Country: Portugal
Contact person: http://inl.int/contractors_projects?section=contract-opportunities
For the attention of: Adrian Watson
E-mail: adrian.watson@inl.int
Telephone: +351 253140112
Fax: +351 253140119

Internet address(es):

General address of the contracting authority: www.inl.int
Address of the buyer profile: <http://inl.int/contractors/info>
Electronic access to information: http://inl.int/contractors_projects?section=contract-opportunities

I.2. Type of the contracting authority

European institution/agency or international organisation

I.3. Main activity

Other: Nanotechnology Research Laboratory

I.4. Contract award on behalf of other contracting authorities

The contracting authority is purchasing on behalf of other contracting authorities: no

Section II: Object of the contract

II.1. Description

II.1.1. Title

Contract for the supply and installation of an aberration-corrected transmission electron microscope (AC-HRTEM) to the International Iberian Nanotechnology Laboratory.

II.1.2. Type of contract and place of performance or delivery

Supplies

Purchase

Main site or place of performance: Avenida Mestre José Veiga, Braga, Portugal.

NUTS code PT112 Cávado

II.1.3. Information about a framework agreement or a dynamic purchasing system (DPS)

II.1.4.

Short description of the contract or purchase(s)

This single lot tender is for an Aberration-Corrected Transmission Electron Microscope (AC-HRTEM). It will be devoted to atomic resolution imaging both in conventional high-resolution TEM (HRTEM) and in scanning high-resolution TEM (HRTEM), and present a suitable set-up to perform in-situ experiments and collect multiple signals, i.e. imaging and spectroscopy, with high spatial resolution and high frame rate.

It is expected to be a very stable instrument with internal parameters accurately determined, therefore allowing complex imaging experiments, such as atomic resolution HRTEM focal series acquisition, and the posterior data treatment and simulation. This system is expected to be remotely-controlled in real time and equipped hardware and software that can support huge datasets to be stored and transferred for post-processing.

Technical Specifications:

Electron beam generation

- High-brightness and stable field-emission gun (FEG). Effective beam current must present fluctuations lower than 0,75 nA/day (long term) or lower than 0,07 nA 6short term/ noise).
- Accurate control for the current density, allowing both analytical microscopy with high current and low-dose imaging of beam sensitive materials.
- Wien-type monochromator system, allowing combination of high currents and ultra-high energy resolution illumination of the sample.

Acceleration, condensing systems

- 300kV, 200kV, 80kV and 60kV operation modes fully aligned at delivery.
- 3-condenser lenses (excluding mini-condenser lens) system that allows full-control for the electron beam size and convergence.
- Highly stable aberration-corrector hardware for the condensing system. An accurate measurement of the aberrations from the condenser lens (upper objective lens) system by the use of Zemlin Tableau method should be supported.
- Highly stable scanning system that allows flawless atomic resolution HRSTEM imaging

Goniometer and sample holder

- Stable goniometer system with movement ranges of at least:
+/- 1.0 mm on X-Y plane
+/-0.3 mm on Z direction

Maximum attainable alpha tilt angle: +/-35°

- Ultra-stable piezoelectric stage for fine sample positioning. Stability better than 0,5 nm/min.
- Low-background single tilt holder and double tilt sample holder with attainable beta tilt of at least 30°.
- MEMS type sample holder for in situ heating (up to 1 000 °C) and electrical biasing experiments

Objective lens

- Highly stable aberration-corrector hardware for the objective system (lower objective lens). An accurate measurement of the aberrations from the objective lens system by the use of Zemlin Tableau method should be supported.
- Pole piece gap of at least 5 mm allowing in situ and tomography experiments.
- Lorentz lens.

Detection and spectroscopy

- Fluorescent screen with a real-time (at least 24 fps) monitoring system for remote operation
- STEM detectors:

High Angle Annular Dark Field (HAADF).

Bright Field (BF) STEM detector

Annular Bright Field (ABF).

Segmented Annular detector for STEM imaging, allowing Annular Dark Field (ADF) and

Differential Phase contrast (DPC) imaging modes with a controllable annular range.

— Fast read-out low-noise 16 Megapixel (4k x 4k) CMOS camera, with a frame rate of at least 24 frames per second at 512x512 pixels

— Low-background X-ray Energy Dispersive Spectroscopy (XEDS) windowless detector with detection solid angle of, at least, 0.7 srad.

— High-energy resolution Electrons Energy Loss Spectroscopy (EELS) spectrometer with a fast shutter, coupled with a low-noise, CCD camera with a dynamic range and fast frame rate.

An acquisition rate on the order of 1000 spectra/s and the possibility of simultaneous measurement of the Zero-loss peak (ZLP) and Core Loss (CL) EELS spectrum is required

Structure, Interface, Peripheral hardware, software

— Insulating microscope enclosure to reduce thermal instabilities and vibration induced by the ambient

— 64-bits software interface for the complete control of the microscope, including the electron gun, optical elements, vacuum system, stage, spectrometers. The software solution must provide real-time remote operation possibility

— User interface to control the microscope with the possibility to automatically recall all optimized operating conditions including lens settings, gun parameters, optical elements alignments for all the different techniques such as TEM imaging, STEM imaging and Spectroscopies setups for different acceleration voltages.

— Highly stable water cooling unit

— Uninterruptible power supply (UPS) system covering the microscope vital parts.

— Fully interlocked oil free vacuum system, with suitable vacuum levels attained on the gun and on the column by individual Ion Getter Pumps (IGP)

— Cooling device with cold trap and liquid nitrogen dewar in the objective lens block to maintain the cleanliness of the vacuum.

— Suitable hardware to monitor and control the heating sample holder

— Suitable software and hardware that allows the local and remote real-time operation of the microscope, including two required connections and monitors.

— Suitable 64-bits software and/or packages to acquire and process microscopy data

TEM images and focal series

STEM images and DPC results

XEDS and EELS spectroscopies

Other requisites

— The company offering the system should make a proposal for:

Assessment of the aberration temporal stability for both correctors and optimization of the existing resolution specs (TEM and STEM)

Low-dose optimization

Technical requisites:

a) Information limit (pm)

Mode 300kV 200kV 80kV 60kV

HRTEM 63 70 90 100

HAADF - HRSTEM 63 80 110 120

The detection systems mentioned above must be adequate to operate for the mentioned acceleration voltages. The HRTEM spatial resolution benchmark should be carried out using Young Fringes experiment. The HRSTEM spatial resolution benchmark should be carried by showing on Si (110) in the Fourier transformed image.

Final energy resolution (eV) monochromator on:

Mode 300kV 200kV 80kV 60kV

Energy Resolution 0.30 0.25 0.20 0.19

To be measured as FWHM of the zero-loss peak after the monochromator tuning.

II.1.5. CPV code(s)

38511200 Transmission electron microscope

II.1.6. Information about the Government Procurement Agreement (GPA)

The procurement is covered by the Government Procurement Agreement: no

II.2. Total value of the contract/lot

II.2.1. Total value of the contract/lot

Value: 2 698 978 EUR
excluding VAT

Section IV: Procedure

IV.1. Type of procedure

IV.1.1. Type of procedure

Open

IV.2. Award criteria

IV.2.1. Award criteria

The most economically advantageous tender in terms of

1. Specifications and technical quality. Weighting 45
2. Price. Weighting 30
3. Warranty, maintenance and service contracts. Weighting 10
4. Technical training. Weighting 5
5. Delivery time. Weighting 5
6. Improvements. Weighting 5

IV.2.2. Information about electronic auction

An electronic auction has been used: no

IV.3. Administrative information

IV.3.1. File reference number attributed by the contracting authority

AW/PF

IV.3.2. Previous publication concerning this procedure

Contract notice

Notice number in the OJ S: [2014/S 176-310346](#) of 13.9.2014

Section V: Award of contract

Contract No: 2014-119193

Lot No: 1

- Lot title: Contract for the supply and installation of an aberration-corrected transmission electron microscope (AC-HRTEM) to the International Iberian Nanotechnology Laboratory

V.1. Date of conclusion of the contract

19.11.2014

V.2. Information about tenders

Number of tenders received: 1

V.3. Name and address of the contractor

Official name: FEI Europe BV Sucursal España
Postal address: Achtseweg Noor 5
Town: Eindhoven
Postal code: 5651 GG
Country: Netherlands
E-mail: sales.iberia@fei.com
Telephone: +34 917459815
Fax: +34 916624539
Internet address: <http://www.fei.com/>

V.4. Information on value of the contract/lot

Initial estimated total value of the contract/lot:
Value: 2 700 000 EUR
excluding VAT
Total value of the procurement:
Value: 2 698 978 EUR
excluding VAT

V.5. Information about subcontracting

The contract is likely to be subcontracted: no

Section VI: Complementary information

VI.1. Information about European Union funds

The procurement is related to a project and/or programme financed by European Union funds:
yes
Identification of the project: This project will be co-financed by the European Regional Development Fund (ERDF), namely through the Programa Operacional Regional Do Norte On. 2 (Portugal).

VI.2. Additional information**VI.3. Procedures for review****VI.3.1. Review body****VI.3.2. Review procedure****VI.3.3. Service from which information about the review procedure may be obtained****VI.4. Date of dispatch of this notice**

29.11.2014