Contract

Contract for the Supply and Installation of a Squid Magnetometer with Versatile Measurement Options to the University of Birmingham

UNIVERSITY OF BIRMINGHAM

F03: Contract award notice
Notice identifier: 2021/S 000-017648
Procurement identifier (OCID): ocds-h6vhtk-02a91e
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Section I: Contracting authority

I.1) Name and addresses

UNIVERSITY OF BIRMINGHAM

Chancellors Close

BIRMINGHAM

B152TT

Contact

Pauline Harrison-Johnson

Email

p.e.harrison@bham.ac.uk

Country

United Kingdom

NUTS code

UKG - West Midlands (England)

Internet address(es)

Main address

https://www.birmingham.ac.uk/index.aspx

I.4) Type of the contracting authority

Body governed by public law

I.5) Main activity

Education

Section II: Object

II.1) Scope of the procurement

II.1.1) Title

Contract for the Supply and Installation of a Squid Magnetometer with Versatile Measurement Options to the University of Birmingham

Reference number

SC9126/21

II.1.2) Main CPV code

- 38400000 - Instruments for checking physical characteristics

II.1.3) Type of contract

Supplies

II.1.4) Short description

This project is funded by UK Research and Innovation's Engineering and Physical

Sciences Research Council (EPSRC) and the University of Birmingham.

The University of Birmingham invites tenders for supply and installation of a Superconducting Quantum Interference Device (SQUID) magnetometer with a versatile range of measurement options. The SQUID magnetometer and its measurement options will form the Midlands Mag Lab, a state-of-the-art magnetometry facility created with the support of an EPSRC Strategic Equipment award. It will facilitate advanced magnetic materials characterisation by academic and industry users in the Midlands region and beyond. The equipment will be used to deliver new understanding of fundamental magnetic materials properties, as well as developing new technologies that exploit the magnetic properties of solids in the areas of quantum materials and technologies, energy materials, and sustainable materials and recycling. The broad user base and diverse range of materials to be characterised with the equipment means that the equipment interface should be user friendly.

The instrument should perform DC and AC magnetometry measurements on a single platform over a temperature range of 2 to 400 K in applied fields of up to 7 T. It should be compatible with a suite of measurement options to enable a versatile range of experimental conditions that meet the needs of the broad user base. Specifically, the measurement options should facilitate DC measurements:

With a moment sensitivity in the range of 1 x 10 - 8 emu,

At controlled sub-0.5 K temperatures as well as between 2 K and 1000 K,

With active cancelation of residual magnetic flux so that samples can be cooled in a field less than 0.05 G,

With field-setting resolution of 0.002 G for a field range up to 20 G,

With sample mounting and automated rotation to enable sample rotations of

up to 360 degrees in 0.1 degree increments in an applied field,

Under applied voltage in a range 0.1 Hz to 100 Hz,

Under applied pressure of at least 1 GPa.

The measurement options should be easily exchangeable and integrated with the main instrument, with the entire system having a single PC-based controller capable of executing automated system setting and data collection. The instrument should be a wet system, connecting directly with the University of Birmingham's helium liquefier system. It should be delivered, installed, and tested on site with a maintenance and service package, with key users provided with training.

This project may be funded by the European Regional Development Fund (ERDF) or;

- European Structural and Investment Fund (ESIF) or;

- UK Research and Innovation (UKRI), the strategic partnership of the UK's seven Research Councils.

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: £721,276

II.2) Description

II.2.2) Additional CPV code(s)

- 38340000 - Instruments for measuring quantities

II.2.3) Place of performance

NUTS codes

- UKG - West Midlands (England)

II.2.4) Description of the procurement

The University of Birmingham invites tenders for supply and installation of a Superconducting Quantum Interference Device (SQUID) magnetometer with a versatile range of measurement options. The SQUID system and its measurement options will form

the Midlands Mag Lab, a state of the art magnetometry facility created with the support of an EPSRC Strategic Equipment award. It will facilitate advanced magnetic materials characterisation by academic and industry users in the Midlands region and beyond. The equipment will be used to deliver new understanding of fundamental magnetic materials properties, as well as developing new technologies that exploit the magnetic properties of solids in the areas of quantum materials and technologies, energy materials and sustainable materials and recycling. The broad user base and diverse range of materials to be characterised with the equipment means that the equipment interface must be user friendly and reliable.

General characteristics

A SQUID magnetometry instrument that can be utilised for high-sensitivity and high throughput DC magnetometry measurements of polycrystalline, single-crystal and thin film magnetic materials. The instrument can also be utilised in AC magnetometry

measurement mode. It is compatible with the range of measurement options as specified in Sections ii - vii below.

Specification

i. The magnetometer should

1) Be a SQUID-based magnetometer,

2) Have a magnetic moment sensitivity of at least 10-8 emu at low fields and

at least 10-7 emu at the maximum field (see ii),

3) Measure a maximum magnetic moment up to 10 emu,

4) Enable measurement of samples of at least 5 mm in diameter,

5) Enable automated sample environment and measurement controls, with

capability for programmable measurement sequences,

6) Operate through a stand-alone software with a user-friendly interface,

7) Be a wet system that consumes less than 5 L of liquid helium per day with a

hold time longer than 10 days.

ii. The magnetic field environment of the magnetometer should

8) Be produced by a superconducting solenoid,

9) Have a field range of at least -7 T to + 7 T,

10) Have a field homogeneity better than 100 ppm over a typical scan length,

11) Have a maximum field charging rate greater than 500 Oe/s,

12) Have a remanent field no greater than 5 Oe when set to zero field after

applying the maximum field.

iii. The temperature environment of the magnetometer should13) Enable continuous operation at any temperature from below 2 K up to 400

K using a liquid helium based wet cryostat,

14) Have a temperature stability of 0.5% or better over the entire

measurement range,

15) Cool from room temperature to base in under 30 minutes.

iv. A low-temperature option should

16) Be a 3He fridge,

17) Have a base temperature of less than 0.5 K,

18) Have a temperature stability of at least 1 %,

19) Cool from room temperature to base in under 3 hours,

20) Have a base temperature hold time greater than 24 hours,

21) Have a recondensation time of less than 30 mins,

22) Be fully compatible with the software and operation of the SQUID magnetometer.

v. A high-temperature option should

23) Enable continuous temperature operation at all temperatures between 300 K and 1000 K,

24) Be fully compatible with the software and operation of the SQUID magnetometer.

vi. A low-field option should

25) Cancel the residual magnetic field of the superconducting solenoid magnet to within 0.05 G of zero field,

26) Have a field resolution better than 0.002 G for applied fields in the range of 20 G,

27) Be fully compatible with the software and operation of the SQUID magnetometer.

vii. An AC magnetometry measurement mode should

28) Have a response that is flat to within 5 % over the range 0.1 Hz - 1 kHz,

29) Have an amplitude of 0.1 - 10 Oe,

30) Have a magnetic moment sensitivity of at least 5 X 10-8 emu and accuracy better than 1 %,

31) Have a phase angle accuracy of at least 0.5,

32) Be fully compatible with the software and operation of the SQUID magnetometer, as well as the low- and high-temperature sample environments.

viii. A high-pressure option should

33) Generate a maximum pressure of at least 1 GPa,

34) Generate minimal magnetic background to the measurement signal,

35) Enable measurement of samples with a diameter greater than 2 mm.

ix. A sample rotation option should

36) Enable 360 sample rotation in 0.1 increments

37) Enable automated control of sample orientation using a stepper motor for sample rotation.

x. An electric transport option should

38) Enable AC/DC resistance measurements,

39) Supply a continuous current between 10 nA and 100 mA,

40) Have a frequency range of at least 0.1 Hz to 100 Hz,

41) Enable application of a magnetic field in parallel and perpendicular to the bias direction,

42) Enable 2 and 4 wire measurements,

43) Enable magnetic measurements to be carried out with the same probe

while applying a voltage.

II.2.5) Award criteria

Quality criterion - Name: Compliance to the Specifications / Weighting: 60

Quality criterion - Name: After Sales and Technical back up / Weighting: 10

Quality criterion - Name: Delivery and Training / Weighting: 10

Quality criterion - Name: Sustainability and Environmental / Weighting: 5

Quality criterion - Name: Standard Supplier Questionnaire (SQ) Part 1 and Part 2 / Weighting: 10

Price - Weighting: 5

II.2.11) Information about options

Options: No

Section IV. Procedure

IV.1) Description

IV.1.1) Type of procedure

Open procedure

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

The procurement is covered by the Government Procurement Agreement: Yes

IV.2) Administrative information

IV.2.1) Previous publication concerning this procedure

Notice number: 2021/S 000-008621

Section V. Award of contract

A contract/lot is awarded: Yes

V.2) Award of contract

V.2.1) Date of conclusion of the contract

19 July 2021

V.2.2) Information about tenders

Number of tenders received: 2

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

V.2.3) Name and address of the contractor

Quantum Design UK and Ireland Ltd

1 Mole Business Park Leatherhead

Surrey

KT22 7BA

Country

United Kingdom

NUTS code

- UKI - London

The contractor is an SME

No

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

Initial estimated total value of the contract/lot: £721,276

Total value of the contract/lot: £721,276

Section VI. Complementary information

VI.4) Procedures for review

VI.4.1) Review body

The University of Birmingham

Birmingham

B15 2TT

Country

United Kingdom