**ANNEX NO. 5 OF DOCUMENTATION OF THE PROCUREMENT PROCEDURE**

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**SPECIFICATION OF THE PUBLIC CONTRACT SUBJECT**

The subject of the public contract shall meet the following requirements for technical parameters and equipment:

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| **Technical specification – Ferroelectric test system** | | |
| **Designation of the delivery (min. brand and type)** | |  |
| **Individual technical parameters of the performance** | | **Data about the offered performance** |
| 1 | Ferroelectric properties tester including measurement electronics, control and measurement software and probe/sample holder compatible with Quantum Design PPMS cryostats. |  |
| 2 | voltage range: +-500 V minimum |  |
| 3 | minimum charge resolution: < 1pC |  |
| 4 | maximum charge resolution: > 100μC |  |
| 5 | minimum hysteresis frequency: < 0.1Hz |  |
| 6 | maximum hysteresis frequency: > 1kHz |  |
| 7 | control and measurement software: automatization of hysteresis, pulse, leakage, IV, and CV measurements |  |
| **probe/sample holder:** | | |
| 8 | operational temperatures: temperature range 10K – 350K minimum |  |
| 9 | tested breakdown voltage to Earth Ground inside the PPMS sample chamber within declared operational temperatures and typical working pressures (units of torr of helium gas): above 1kV |  |
| 10 | sample space: 10mm x 10mm minimum |  |

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| **Technical specification**­­ **­– Impedance analyzer** | | |
| **Designation of the delivery (min. brand and type)** | |  |
| **Individual technical parameters of the performance** | | **Data about the offered performance** |
| 1 | Determination of the response in subHz – MHz frequency range |  |
| 2 | minimum frequency range: below 0.1 Hz – above 10 MHz |  |
| 3 | minimum impedance range: below 1 mOhm – above 10 Tohm |  |
| 4 | minimum capacitance range: from 1fF – up to 1F |  |
| 5 | DC bias: +- 40V minimum |  |
| 6 | measurement configuration: two, three, or four wire  as an option: extended voltage range 1000 V peak-peak minimum at decrease frequency range – minimum range below 0.1 Hz – above 1 kHz |  |
| 7 | control software allowing automatization of typical measurement procedures (determination of complex dielectric function, modulus, conductivity, impedance as a function of frequency, time, AC voltage or DC bias) and visualizations of the outcome |  |

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| **Technical specification**­­ **­– Multifunctional optical source** | | |
| **Designation of the delivery (min. brand and type)** | |  |
| **Individual technical parameters of the performance** | | **Data about the offered performance** |
| 1 | Multifunctional optical source (continuous and pulsed, five wavelengths) for optical spectroscopy, operando spectroscopy, spectro-microscopy, and magnetometry under various external conditions (field, temperature) provided by existing cryostats. |  |
| **Laser heads** | | |
| 2 | 375 and 470 nm single shot, pulse regime 40MHz, CW operation |  |
| 3 | 633 and 780 nm single shot, pulse regime 80MHz, CW operation |  |
| 4 | 760nm narrow bandwidth, single shot pulse regime 80MHz |  |
| 5 | Additional specification: 633±1 nm, linewidth <0.2nm, 760±3 nm, linewidth <0.2nm, other wavelengths ±10 nm |  |
| **Emission power** | | |
| 6 | 375nm, up to 5mW @40MHz, CW 40mW |  |
| 7 | 470nm, up to 4mW @40MHz, CW 60mW |  |
| 8 | 633nm, up to 20mW @80MHz, CW 50mW |  |
| 9 | 780nm, up to 10mW @80MHz, CW 40mW |  |
| 10 | 760nm, up to 6mW @80MHz, CW mode not required |  |
| **Laser heads connected via compact fiber coupling** | | |
| 11 | single-mode fiber coupler |  |
| 12 | incl. variable attenuator |  |
| 13 | incl. mounting baseplate |  |
| 14 | optimized for the wavelength range |  |
| **Single-mode fiber cables for every wavelength** | | |
| 15 | 375 and 470 nm |  |
| 16 | polarization-maintaining |  |
| 17 | length 3.0 m, cutoff < 375 nm |  |
| 18 | MFD = 3.6 μm, NA = 0.08 |  |
| 19 | output connector FC/APC |  |
| **633, 760, and 780 nm** | | |
| 20 | polarization-maintainin |  |
| 21 | length 2.5 m, cutoff < 570 nm |  |
| 22 | MFD = 4.0 μm, NA = 0.11 |  |
| 23 | output connector FC/APC |  |
| 24 | Included: collimators |  |
| 25 | Included: temperature stabilization |  |