

UNIVERSITY OF MISSISSIPPI

Notice of Intent to Certify Sole Source

SS 109

The University of Mississippi (UM) anticipates purchasing the item(s) listed below as a sole source purchase. Anyone objecting to this purchase as a sole source shall follow the procedures outlined below.

Commodity or commodities to be purchased (manufacturer, model, description):

Coherent Inc. Astrella-F-1K and accompanying upgrades

The need to be fulfilled by this item(s) and why it is the only one that can meet the specific needs of the department:

We require the Coherent Astrella-F-1K (one box femtosecond amplifier system with an air-cooled chiller) and the accompanying upgrades: OPerA Solo System, OPerA Solo FH Option, OPerA Solo NDFG1/2-KTA Option (for studies in the range 2600-20000 nm), and OPerA Solo Legend/Libra routing kit (6.25"/6.5" H). We have recently been funded by the National Science Foundation (NSF award #OIA-1757220) to perform cutting edge, state of the art femtosecond transient-absorption spectroscopy research. The Coherent Astrella-F-1K with accompanying upgrades is the only laser system that we have identified that meets the strict requirements of the research program. We must procure a standardized, fully-integrated, turn-key, one-box, industrial femtosecond laser system and two accompanying Optical Parametric Amplifiers (OPAs) with certain key specifications and considerations for this research. Due to the complexity of our required measurements, we require a laser system that meets critical parameters so that is fully compatible with femtosecond transient absorption spectrometers (Ultrafast Systems Helios-IR-FIRE and Helios-VIS-FIRE) specifically detailed in the funded grant proposal. The laser system must provide pulses of the right characteristics as stably, repeatedly, and reliably as possible. In essence, we need a laser system which meets certain specs while involving the least amount of complexity, and highest amount of quality assurance. The laser system must also meet certain standards of quality and design integrity. The following characteristics are considered essential: 1. Amplifier General Requirements: a) The laser system must be a standard product. We will not consider custom systems due to the higher risk of performance issues inherent to products that are nonstandard, or "one-off" systems. The laser system must be based on published datasheets. b) Laser must be a one-box system due to space constraints and to maximize table space for experiments. c) Laser system must provide 7 mJ, 100 fs pulses at 1 kHz with a standard oscillator that provides at least 70 nm of bandwidth at 80 MHz repetition rate, and a standard pump laser that provides at least 38 mJ of pump energy.

The laser should have a built-in side port for auxiliary access to oscillator beam. d) Diffraction gratings must be completely gasket-sealed inside a compartment with desiccant. All humidity-sensitive components need to be properly sealed off from the ambient lab environment. Diffraction gratings are particularly sensitive to ambient humidity and will degrade quickly unless protected behind a gasket seal. e) We require that the laser employ only water-cooling (as opposed to thermo-electric cooling and/or cryogenic cooling) of the laser crystal(s) with room-temperature water. This removes the possibility of ice buildup on the crystal due to ambient humidity. A single chiller for the system is strongly preferred. f) The laser vendor must perform quality control and assurance with as high a degree of rigor as possible. Some examples might be vibrational and temperature cycling. We should give strong preference to vendors who screen all units before shipment. Such screening minimizes chances of project downtime due to certain defects in manufacturing. Preference should be given to the vendor with the best methods of QA.

2. Amplifier Specification Requirements:

- Pulse Energy: >7 mJ
- Pulse Repetition Rate: 1 kHz
- Average Power: >7 W
- Pulse Duration: <100 fs
- M²: <1.25
- Center Wavelength: 800 nm nominal
- Pre-pulse contrast: 1000:1
- Post-pulse contrast: 100:1
- Power Stability: 0.5% rms over 24 hours
- Polarization: Linear, horizontal
- Pointing stability: <10 μ rad over 24 hours
- Output Beam Size: 11 mm $1/e^2$

3. Seed Laser General Requirements:

- Seed laser system must undergo independent quality-control with maximum rigor.
- Seed laser must be integrated internally into the amplifier system.
- Seed laser must have internal, integrated pump laser.
- Integrated pump laser must employ Optically-Pumped Semiconductor (OPSL) architecture to minimize optical “green noise” and changes to beam divergence when the output power is adjusted.
- Vendor must be able to show sample data of >2 years continuous life testing at 100% power to ensure long-term reliability.

4. Seed Laser Specification Requirements:

- Power (@ 70 nm of bandwidth) >325 mW
- Center wavelength 800 nm
- Bandwidth (FWHM) 70 nm (fixed)
- Pulse Duration (FWHM compressed) <20 fs
- Power Stability \pm 0.5 %
- RMS Noise <0.1 %
- Power Stability \pm 0.5 %
- Repetition Rate 80 MHz
- M² <1.3
- Beam Diameter ($1/e^2$ at output) 1 mm
- Pump laser gain medium Optically-Pumped Semiconductor

5. Amplifier Pump Laser General Requirements:

- Pump system must undergo independent quality-control with maximum rigor.
- Preference will be given to systems with highest pump pulse energy.
- Laser Power Supply will be connected to the Laser Head by a detachable umbilical, which contains the diode current lines and control signals.
- Laser will be computer controlled via computer, and control software will be included. Laptop computer provided.

6. Amplifier Pump Laser Specification Requirements:

- Wavelength 527 nm
- Energy per pulse >38 mJ @ 1 kHz, > 6.5 mJ @ 10 kHz
- Average Power >38 W @ 1 kHz, > 65 W @ 10 kHz
- Energy stability <0.5 % rms
- Spatial Mode Multi-mode, quasi flat top
- M² <25
- Beam diameter at output window: 3 mm
- Electrical requirements 100-240 VAC
- Pulse duration <150 ns @ 1 kHz

7. Optical Parametric Amplifier (OPA) General Requirements: The required OPA system must be a fully integrated, one-box system with the following specifications and parameters:

- The OPA system must have single laptop computer control of all components with unified software control to allow operators to adjust system parameters and verify status of the optimization loops.
- The OPA shall have accessories that extended the wavelength range from 290 nm to 2600 nm. The entire OPA, including all wavelength extension modules, must be housed in one enclosure.
- Design configuration – For ease of operation and enhanced eye safety, we require that all optics for OPA operation (including harmonic generation, sum and difference frequency

generation, beam conditioning, telescopes, wavelength separation elements and electronics) be housed in a single enclosure. • OPA must have white-light seeded pre-amp for lowest possible noise • 800nm Fundamental Fresh pump – We require that the OPA use a portion of the incoming 800 nm light (rather than the depleted 800 nm pump beam) for mixing. This “fresh pump” configuration ensures optimal spatial, temporal and spectral mixing performance. • Output ports – For optimum convenience and safety we require that outputs from the OPA be dedicated to beams from a specific tuning range and that all other beams do not exit the enclosure. 8. OPA Specification Requirements: OPA 1 • Signal + Idler Range: 1140 – 2600 nm with computer control tuning and wavelength selection. • Signal + Idler Power*: >220 μ J • SH Package 580 – 1150 nm • SH Package Power*: >50 uJ • SF Package: 480 – 580 nm • SF Package Power*: >70 uJ @ 480 – 533 nm, >50 uJ @ 533 – 580 nm • FH Package: 290 – 480 nm • FH Package Power*: >10 uJ OPA 2 • Signal + Idler Range: 1140 – 2600 nm with computer control tuning and wavelength selection. • Signal + Idler Power*: >220 μ J • NDFG1/2 Package Power*: >8 uJ @ 4000 nm, >1.5 uJ @ 10,000 nm, >0.3 uJ @ 15,000 nm *with 1 mJ input; Output energies should scale linearly with input energies from 0.3 – 4.5 mJ for <130 fs pump input.

Name of company/individual selling the item and why that source is the only possible source that can provide the required item(s):

Coherent Inc. sells directly and does not have resellers.

Why the amount to be expended for the commodity is reasonable:

The list purchase price (including all necessary components) is competitive with other inferior models from other manufacturers whose performance is unacceptable. The discounted price is considered a very good deal.

Efforts that the agency went through to obtain the best possible price for the commodity:

We negotiated with the vendor to reduce the list price to provide our pricing which represents a 20% discount.

Submission Instructions and Format of Response from Objecting Parties:

Interested parties who have reason to believe that the item(s) above should not be certified as a sole source should provide information in the following format for UM to use in determining whether or not to proceed with awarding the Sole Source purchase.

1.1 Interested Party Information

1.1.1 Contact Name, Phone Number, Address and email address

1.1.2 Company Website URL, if applicable

1.2 Objection to Sole Source Certification

1.2.1 Interested parties must present specific objections to the Sole Source certification using the criteria listed above.

1.2.2 A statement regarding the Interested Party's capabilities as related to this Sole Source Certification Request.

1.3 Comments will be accepted at any time prior to Friday, October 12, 2018 at 10:00 am (Central Time) to Katherine Jones at kajones4@olemiss.edu (with Cc: to purchase@olemiss.edu) at The University of Mississippi Procurement Services Department, 164 Jeanette Phillips Drive, PO Box 1848, University, Mississippi 38677. Responses may be delivered by hand, via regular mail, overnight delivery, or e-mail. The envelope or email should reference the sole source number. UM WILL NOT BE RESPONSIBLE FOR DELAYS IN THE DELIVERY OF RESPONSES. It is solely the responsibility of the Interested Parties that responses reach UM on time. Interested Parties may contact Katherine Jones to verify the receipt of their Responses. Responses received after the deadline will be rejected.

If after a review of the submitted notice and documents, UM determines that the commodity in the proposed sole source request can be provided by another person or entity, then UM will withdraw the sole source certification and submit the procurement of the commodity to an advertised competitive bid or selection process.

If UM determines after review that there is only one (1) source for the required commodity, then UM will appeal to the Public Procurement Review Board for approval to purchase.