UNIVERSITY OF MISSISSIPPI

Notice of Intent to Certify Sole Source

SS 111

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):

Ultrafast Systems HELIOS FIRE femtosecond transient absorption spectrometer system

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 Ultrafast Systems HELIOS FIRE femtosecond transient absorption spectrometer system. This include both the Helios-IR-FIRE and Helios-VIS-FIRE along with upgraded components including the HE-VIS-NIR-FIRE-TO-HE-VIS-FIRE extension, HE-EOS-VIS-NIR-TO-HE-VIS-NIR-F extension, Short wave infrared (SWIR) extension for HELIOS and EOS, HE-UV-FIRE probe generation module for a UV-enhanced continuum, SMART PUMP extension, SURFACE XPLORER data analysis software for analyzing transient absorption/emission data, TO-TOPAS, TO-PROBE, TO-OPA, and TO-OPA-IR transport optics, two TSH-FIRE Motorized, computer controlled translating sample holders, and MCT- 64x2 HgCdTe 64 pixel dual array detector for the Helios-IR transient absorption spectrometer. 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 experiments from the ultraviolet region of the electromagnetic spectrum out to at least 13 um using the Ultrafast Systems HELIOS FIRE femtosecond transient absorption spectrometer system. This system (including the Helios-IR-FIRE and Helios-VIS-FIRE along with upgraded components) is specifically detailed in the funded grant proposal and is required for the funded research. This system must also be fully compatible with the Coherent Astrella-F-1K pump laser system. In general, the spectrometers need to be hands-off and offer a large degree of user customization, such as easily removable side panels and a customizable layout. One must have a spectral range of 320-1600nm and the other of 2-13 um. Requirements for the fs Transient Absorption Spectrometer: • Automation features: o Automated, hands-off optical delay line alignment o Automated pump beam alignment o Automated switching between UV, VIS, NIR spectral ranges • Sample compartment – not smaller than 300 mm x 300 mm • Parabolic reflectors for probe management • Modular design. The optical bench and the delay line should be in separate housings to allow for a more flexible laser table layout. • Optical delay line o Completely hands-off, fully automated

alignment. o Time window: 8 ns o Resolution: 14 fs o Minimum step size: 2.8 fs o Max. speed: >10 ns/s o Acceleration: > 260 ns/s^2 o Automated alignment time: 3-5 min o Beam pointing drift: <10 μm over the 8 ns delay range o Located in a separate housing o Optical throughput >60%. • Time window extendable to micro- and milliseconds with sub-ns time resolution within the same optical bench. • Sample holder with a magnetic stirrer. Easily upgradable to XY rastering sample holder. • Built-in probe reference option. • Spectrometer control software o The data acquisition software has to have built-in support for the automated alignment of all critical optical elements for hands-off operation. - Automated alignment of the optical delay line - Automated alignment of the pump beam - Computer controlled switching between UV, VIS, NIR modes - Support for computer controlled translating sample holder - Support for pump beam shutter - Support for motorized filter wheel for automated pump intensity control o Should save every individual kinetic scan, so if experiment is aborted (due to laser fluctuations, power outages, etc.), all previous scans are not lost. o Ability to set the continuum pulse rejection- mode where the software collects data points again if the continuum is not stable within the preset values. o Two levels of user access for increase user-friendliness - basic (default, most commonly used settings), advanced (allows to change DAQ parameters, such as continuum stability thresholds, etc.) o Support for multiple choppers to facilitate customized experiments, such as “pump-pump-probe”, “pump-dump-probe” or experiments where the probe beam is also modulated. o API (Application Programming Interface) should be provided for further experiment customization and integration with external applications. For example, studying temperature dependence on the kinetics with a computer-controlled cryostat, a filter wheel, an OPA etc. should be possible to automate through the API. The API should be in a form of a dll, which can be called from any programming language. • Fully automated pump beam alignment option. The spectrometer software should be able to ensure a continuous overlap of the pump and probe beams in a sample with <10 μm precision. • Temporal Resolution. The instrument response function of the spectrometer should be a cross-correlation of the pump and probe pulses. • Probe spectral ranges requested: o 320-750 nm o 420-800 nm o 800-1600 nm o 1600-2400 nm • Spectral Resolution requested: o VIS – 4 nm o NIR – 13 nm o SWIR – 13 nm • Sensitivity requirements benchmark/example: o Sample – saturated solution of ZnTPP (Zn tetra-phenyl porphyrin) in toluene o Excitation - Wavelength 400 nm - Pulse energy 40 nJ o Transient absorption signal at 1 ps after the excitation pulse: - Wavelength 460 nm, DeltaA >50 mOD - Wavelength 500 nm, DeltaA >25 mOD - Wavelength 600 nm, DeltaA >5 mOD • Detectors o VIS. Fiber-coupled alignment-free spectrometer with a 1024 pixel CMOS sensor (spectral response: 200-1000 nm). Spectral range ~600 nm (ie. 350-950 nm). Spectral acquisition rate - > 2000 spectra/s. ADC resolution ≥14 bit. Need to be mounted outside of the optical bench. o NIR. Fiber-coupled alignment-free spectrometer with a 256 pixel InGaAs sensor (spectral response: 800-1600 nm). Spectral range ~800 nm (ie. 800-1600 nm). Spectral acquisition rate >2000 spectra/s. ADC resolution >≥14 bit. Need to be mounted outside of the optical bench. o SWIR. Fiber-coupled alignment-free spectrometer with a 256 pixel InGaAs sensor (spectral response: 1000-2600 nm). Spectral range ~800 nm (ie. 1600-2400 nm). Spectral acquisition rate >2000 spectra/s. ADC resolution >≥14 bit. Need to be mounted outside of the optical bench. • Dimensions not to exceed: o Optical bench: W457 x L915 x H250 mm o Delay line: W280 x L915 x H250 mm Requirements for the Mid-IR Transient Absorption Spectrometer: • Automation features: o Automated, hands-off optical delay line alignment o Automated pump beam

alignment • Sample compartment – not smaller than 225 mm x 300 mm • Parabolic reflectors for probe management • Modular design. The optical bench and the delay line should be in separate housings to allow for a more flexible laser table layout. • Optical delay line o Completely hands-off, fully automated alignment. o Time window: 8 ns o Resolution: 14 fs o Minimum step size: 2.8 fs o Max. speed: >10 ns/s o Acceleration: > 260 ns/s^2 o Automated alignment time: 3-5 min o Beam pointing drift: <10 µm over the 8 ns delay range o Located in a separate housing o Optical throughput >60%. • Option for extending the time window to micro- and milliseconds with sub-ns time resolution within the same optical bench. • Sample holder with an XY rastering sample holder. • Built-in probe reference option. • Spectrometer control software o The data acquisition software has to have built-in support for the automated alignment of all critical optical elements for hands-off operation. - Automated alignment of the optical delay line - Automated alignment of the pump beam - Support for computer controlled translating sample holder - Support for pump beam shutter - Support for motorized filter wheel for automated pump intensity control o Should save every individual kinetic scan, so if experiment is aborted (due to laser fluctuations, power outages, etc.), all previous scans are not lost. o Ability to set the probe pulse rejection- mode where the software collects data points again if the continuum is not stable within the preset values. o Two levels of user access for increase user-friendliness - basic (default, most commonly used settings), advanced (allows to change DAQ parameters, such as probe stability thresholds, etc.) o Support for multiple choppers to facilitate customized experiments, such as “pump-pump-probe”, “pump-dump-probe” or experiments where the probe beam is also modulated. o API (Application Programming Interface) should be provided for further experiment customization and integration with external applications. For example, studying temperature dependence on the kinetics with a computer-controlled cryostat, a filter wheel, an OPA etc. should be possible to automate through the API. The API should be in a form of a dll, which can be called from any programming language. • Temporal Resolution. The instrument response function of the spectrometer should be a cross-correlation of the pump and probe pulses. • Detectors o Dual MCT array with 64 pixels in each row coupled a to three-grating imaging spectrograph (320 mm; f/4.1) to allow for different detection bandwidths and spectral resolution. • Dimensions not to exceed: o Optical bench: W355 x L915 x H250 mm o Delay line: W280 x L915 x H250 mm

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

Ultrafast Systems 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 19.5% 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.