Clear Fields

UCF | Procurement Services

# SOLE SOURCE CERTIFICATE AND POSTING NOTICE

(Greater than $150,000)

A sole source procurement is when you make a request to purchase product(s) and/or service(s) without competition when competition is otherwise required. This means that product/service is unique and that the supplier is the only supplier that can provide the product or service. In accordance with the authority granted under applicable Florida law and UCF Regulation 7.130, the following documentation is submitted in support of this request.

This form and related documentation shall be submitted through Workday Help using case type Waivers and Sole Source. Please do not attach to a requisition or send via email for review and approval.

WD case subject title should have common structure for easy tracking, to include:

- Exemption type (Sole Source)
- Supplier name
- Purchase amount

The completed sole source must be approved in the following order. **Please be sure to obtain all required signatures before submitting the form to Procurement Services.**

- PI/Researcher/Director/Chair
- President/Vice President/Dean
- Procurement Specialist
- Procurement Services Manager or Associate Director
- Assistant Vice President for Tax, Payables & Procurement, who will review and provide a recommendation to approve or disapprove the sole source to:
- Chief Financial Officer, who will either directly approve or disapprove the sole source, or forward it to the Provost and Executive Vice President for goods/services related to academia for input prior to making the final decision.

Once the completed sole source is received, Procurement Services in collaboration with kNEXT reviews the documentation provided and determines whether the sole source is valid or if there are additional suppliers that may be able to provide the requested product or service. The sole source review and approval process varies based on the nature of the product/service being requested and the information provided in the requestor's justification, among other factors, so please keep this in mind when submitting the form.

Contingent upon the approval of all the officers/individuals listed, the sole source shall be posted on the UCF Procurement Services website for seventy-two (72) hours. Upon expiration of said posting period, Procurement Services will process a purchase order upon receipt of the requisition.

**The usual bidding process shall be conducted if sole source approval is not granted**.

## PART I: DEPARTMENT AND SUPPLIER INFORMATION

Department Name: Chemistry

Contact & Phone: Tom Hopper, 650-709-6985

Product/Service Cost: $600,010

✓ One Time Purchase __Term Contract: _____

__ Multiple Purchases __ Duration: _____

Company Name: Light Conversion

Email: Andrey@LightCon-USA.com

Contact Person: Andrey Senin

Title: Director, Ultrafast Scientific

Product and/or Service: Fully integrated MHz laser system and spectrometer

## PART II: SOLE SOURCE JUSTIFICATION (see pages 4-5)

**Only justifications submitted on this form and in the below format will be reviewed for approval. All the listed points MUST be fully answered on the following pages and any additional attached pages as needed. Failure to submit justification as outlined in the format below will result in the form being returned without review.**

## PART III: SOLE SOURCE CERTIFICATIONS

A. In my professional opinion, this is the only product or service that can reasonably meet my requirement(s)/specification(s), and this is the only supplier who can provide the product or service. I further certify that the information contained herein is true and correct to the best of my knowledge and belief and would withstand any audit or supplier protest.

B. I, the undersigned, certify that I and/or the user do not have a financial interest in the above named supplier or contractor, and that I am unaware of any conflict of interest related to this purchase.

| Tom Hopper Digitally signed by Tom Hopper Date: 2024.12.16 09:30:48 -05'00' | Tom Hopper (PI) | 12/16/2024 |
|---|---|---|
| **Signature** | **Printed Name and Title (PI/Researcher/Director/Chair)** | **Date** |
| Maggy Tomova Digitally signed by Maggy Tomova Date: 2024.12.17 06:58:18 -05'00' | | |
| **Signature** | **Printed Name and Title (President/Vice President/Dean)** (Delegations not allowed; emails from absent approvers are acceptable) | **Date** |

I, the undersigned, hereby concur with the above justification and support a sole source approval for the above product(s) and/or service(s). Approvals may be documented and supported via email.

| See below email approval | | |
|---|---|---|
| **Signature** | **Printed Name and Title (Procurement Specialist)** | **Date** |
| See below email approval | | |
| **Signature** | **Printed Name and Title (Procurement Services Manager or Associate Director)** | **Date** |
| See below email approval | | |
| **Signature** | **Printed Name and Title (Asst. Vice President for Tax, Payables & Procurement)** | **Date** |

See below email approval

| Signature | Printed Name and Title (Chief Financial Officer) | Date |
|---|---|---|

## POSTING NOTICE

| Date/Time Posted | Posting End Date | UCF Control No. | Procurement Specialist |
|---|---|---|---|
| 1/24/25 @ 11:00 am EST | 1/27/25 @ 11 am EST | 2506 | Trinh Nguyen |

## SOLE SOURCE JUSTIFICATION

Please answer the questions below and attach additional documentation if needed.

1. Describe the product(s) and/or service(s) and anticipated use thereof in layman's language.

Integrated laser system and spectrometer, with delivery/installation included.
Will be used for laser spectroscopy experiments.

2. Describe the required specifications or requirements and why are they essential to the accomplishment of your work.

The Light Conversion PHAROS laser system produces ultrashort (femtosecond) pulses at MHz repetition rates which are essential for ultrafast spectroscopy experiments with high signal-to-noise and time resolution. The optical parametric amplifiers (OPAs) enable experiments to be performed over a wide range of wavelengths, from the UV to the IR. The integrated HARPIA transient absorption spectrometer will enable fast 'plug and play' measurements.

Provide the names of other suppliers, products and/or services that you have investigated and explain why they do not meet the required specifications or requirements. It may be helpful to present your information in a table like the one below.

| Required Specifications | Supplier 1 | Supplier 2 | Supplier 3 | Supplier 4 |
|---|---|---|---|---|
| | Y/N | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N | Y/N |
| | Y/N | Y/N | Y/N | Y/N |

Coherent produces a MHz laser system, but the pulse duration is relatively long (~350 fs) which fundamentally limits the time resolution of the experiments. They also do not provide a integrated transient absorption spectrometer.

Ultrafast systems have OPAs for wavelength conversion, as well as a transient absorption spectrometer, however, they do not have a MHz laser system available, and the pulse duration of their lasers tends to be quite long (min 290 fs).

Spectra Physics do not yet produce a MHz laser system with high pulse energy (>1 mJ) and short duration (~100 fs), and do not have a transient absorption spectrometer on offer.

3. State in detail why only this and no other product(s)/service(s) will satisfy the department's requirements. Description may include unique features, compatibility, specifications, availability, delivery time frame etc. (For example, please list the features or special conditions that are unique and only available from one supplier. Note: Price is not a valid reason.)

No other supplier (e.g. Coherent, Spectra Physics, Ultrafast Systems) have a laser system with *ALL* of the desired specifications (high repetition rate, short pulse duration) *AND* accessories (OPA for wavelength conversion, transient absorption spectrometer). Light Conversion can provide all this equipment, and acquiring it all from the same company will significantly facilitate the setup of the lab (one company for delivery/installation, and all instrumentation is compatible by definition).

4. Are there resellers or distributors? If yes, please list names and contact information.

No

5. Will this purchase obligate UCF to this vendor for future purchases such as maintenance, licensing, or continuing need? ___ Yes ✓ No

If yes, please provide details regarding future obligations and/or needs to include number of years and total spending amount of obligations:

Beyond the initial purchase maintenance is optional.

6. What efforts have been made to obtain the best pricing available? Please provide an explanation to support the belief that the price is fair and reasonable.

The PI has negotiated a quote comprising all the required equipment and services with a special $115,890 discount.

**From:** Gerald Hector
**To:** Joel Levenson
**Cc:** Trinh Nguyen; Nellie Nido; Brian Sargent
**Subject:** RE: C01110333 - Sole Source - Light Conversion
**Date:** Friday, January 24, 2025 8:50:51 AM
**Attachments:** image003.png

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Joel:

I approve of this sole source request.

Regards,

Gerald L. Hector, CPA
Senior Vice President
Administration and Finance
University of Central Florida
4635 Andromeda Loop N
MH384
Orlando, FL 32816
Tel: (407) 823-1063
Email: gerald.hector@ucf.edu


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**From:** Joel Levenson <Joel.Levenson@ucf.edu>
**Sent:** Thursday, January 16, 2025 9:40 AM
**To:** Gerald Hector <Gerald.Hector@ucf.edu>
**Cc:** Trinh Nguyen <Trinh.Nguyen@ucf.edu>; Nellie Nido <nellie.nido@ucf.edu>; Brian Sargent <Brian.Sargent@ucf.edu>
**Subject:** RE: C01110333 - Sole Source - Light Conversion

Good morning Gerald,

I support this sole source as well. Research into other products did not yield the required specifications of the PI. Utah State has also issued a sole source for this equipment.

Please review and if you approve, reply all and let us know. If you have additional questions, we're here to help.

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**From:** Brian Sargent <Brian.Sargent@ucf.edu>
**Sent:** Wednesday, January 15, 2025 4:17 PM
**To:** Joel Levenson <Joel.Levenson@ucf.edu>
**Cc:** Trinh Nguyen <Trinh.Nguyen@ucf.edu>; Nellie Nido <nellie.nido@ucf.edu>
**Subject:** FW: C01110333 - Sole Source - Light Conversion

Good afternoon Joel,

I support this sole source as well. Light Conversion's laser system is the only product that produces ultrashort pulses at MHz with high pulse Energy (>mJ) and short duration (~100fs), which is a requirement of the research Chemistry is undertaking.

Additionally, a search of GovSpend identified a sole source issued by Utah State for the same system and reasoning.

Please approve/disapprove and let me know if you have any questions.

Regards,
Brian

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**From:** Trinh Nguyen <Trinh.Nguyen@ucf.edu>
**Sent:** Tuesday, January 14, 2025 3:16 PM
**To:** Brian Sargent <Brian.Sargent@ucf.edu>
**Subject:** C01110333 - Sole Source - Light Conversion

Hi Brian,

I have reviewed the attached sole source and can support it for the following reasons. Can you please also review to see if you agree or not?

Vendor: Light Conversion
Product: Fully integrated MHz laser System and Spectrometer (PHAORS Laser System)

Total Amount: $600,010
Dept: Chemistry

**Requirement:** The department wants to purchase a laser system that produces ultrashort (femtosecond) pulses at MHz repetition rates that are required for ultrafast spectroscopy experiments.

**Research Conducted:** The PI confirmed in the below email that to the best of his knowledge, the suppliers listed below are the only ones in the marketplace that can provide a laser system for ultrafast spectroscopy experiments. However, only the product from Light Conversion can meet all the below requirements.

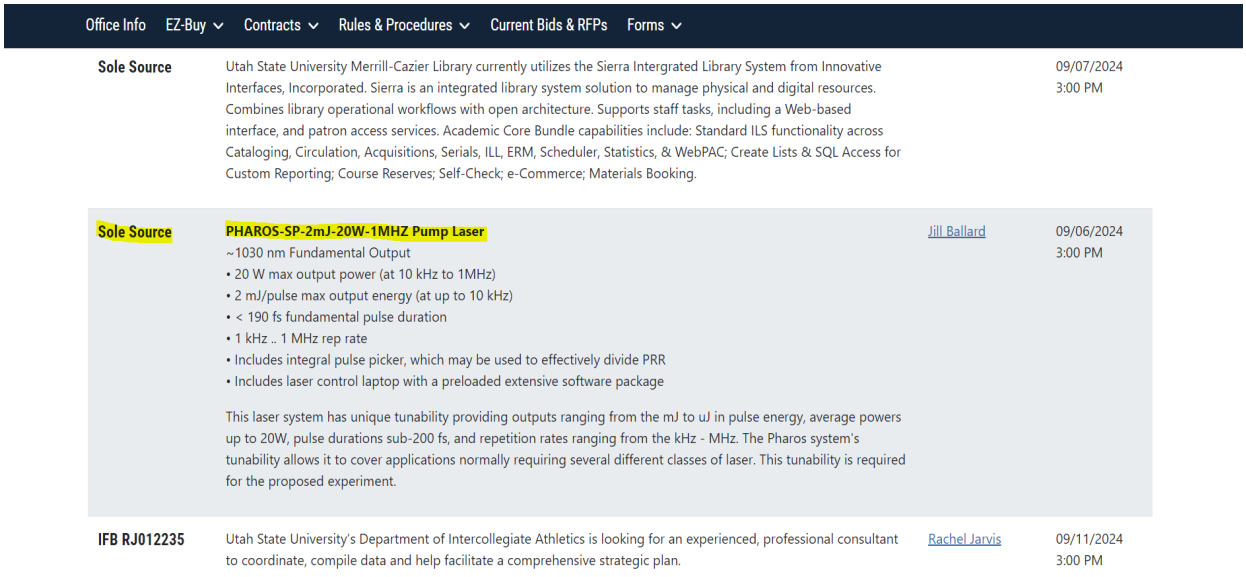
| Specifications Requirements | Light Conversion (PHAORS Laser System) | Coherent | Ultrafast Systems | Spectra Physics |
|---|---|---|---|---|
| MHz Laser system with High pulse Energy (>mJ) and short duration (~100fs) | Yes | No | No | No |
| Optical Parametric Amplifiers (OPAs) enable experiments to be performed over a wide range of wavelengths, from UV to IR. | Yes | Yes | Yes | No |
| Transient absorption spectrometer that will enable fast 'plug and play' measurements. | Yes | No | Yes | No |

- The PHAORS Laser System from Light Conversion is the only system out in the market that can offer a laser system that produces ultrashort pulses at MHz with high pulse Energy (>mJ) and short duration (~100fs).
- Both Coherent and Ultrafast Systems have systems with relatively longer pulse durations.
- Spectra Physics does not a produce a MHz laser system currently

There are no resellers/distributors for the MHz laser system from Light Conversion.

**Price is fair and reasonable:** The price is deemed fair and reasonable given that the laser system from Light Conversion is the only one that can meet all the above requirements. The PI has negotiated the required equipment and services with a special discount ($115,890).

The **Utha State University** had posted a Sole Source Notice for the exact same laser equipment back in September of 2024 with the same reasoning that they need a laser system with mJ to uJ in pulse energy, average powers up to 20W, pulse durations sub-200 fs, and repetition rates in the MHz [Current Bids and RFP's | Purchasing | USU]



Office Info | EZ-Buy | Contracts | Rules & Procedures | Current Bids & RFPs | Forms

| | | | |
|---|---|---|---|
| Sole Source | Utah State University Merrill-Cazier Library currently utilizes the Sierra Intergrated Library System from Innovative Interfaces, Incorporated. Sierra is an integrated library system solution to manage physical and digital resources. Combines library operational workflows with open architecture. Supports staff tasks, including a Web-based interface, and patron access services. Academic Core Bundle capabilities include: Standard ILS functionality across Cataloging, Circulation, Acquisitions, Serials, ILL, ERM, Scheduler, Statistics, & WebPAC; Create Lists & SQL Access for Custom Reporting; Course Reserves; Self-Check; e-Commerce; Materials Booking. | | 09/07/2024 3:00 PM |
| Sole Source | PHAROS-SP-2mJ-20W-1MHZ Pump Laser<br>~1030 nm Fundamental Output<br>• 20 W max output power (at 10 kHz to 1MHz)<br>• 2 mJ/pulse max output energy (at up to 10 kHz)<br>• < 190 fs fundamental pulse duration<br>• 1 kHz .. 1 MHz rep rate<br>• Includes integral pulse picker, which may be used to effectively divide PRR<br>• Includes laser control laptop with a preloaded extensive software package<br><br>This laser system has unique tunability providing outputs ranging from the mJ to uJ in pulse energy, average powers up to 20W, pulse durations sub-200 fs, and repetition rates ranging from the kHz - MHz. The Pharos system's tunability allows it to cover applications normally requiring several different classes of laser. This tunability is required for the proposed experiment. | Jill Ballard | 09/06/2024 3:00 PM |
| IFB RJ012235 | Utah State University's Department of Intercollegiate Athletics is looking for an experienced, professional consultant to coordinate, compile data and help facilitate a comprehensive strategic plan. | Rachel Jarvis | 09/11/2024 3:00 PM |

Thanks,
Trinh

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**From:** Tom Hopper <thomas.hopper@ucf.edu>
**Sent:** Friday, January 10, 2025 4:49 PM

**To:** Trinh Nguyen <Trinh.Nguyen@ucf.edu>
**Cc:** Noha Bukatwa <Noha.Bukatwa@ucf.edu>
**Subject:** Re: UCF-TH - PO status? [quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)]

Hi Trinh

Correct, to my knowledge no one else can provide a MHz system with all the other required features.

Many thanks

Tom

Sent from Outlook for Android

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**From:** Trinh Nguyen <Trinh.Nguyen@ucf.edu>
**Sent:** Friday, January 10, 2025 3:53:01 PM
**To:** Tom Hopper <thomas.hopper@ucf.edu>
**Cc:** Noha Bukatwa <Noha.Bukatwa@ucf.edu>
**Subject:** RE: UCF-TH - PO status? [quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)]

Hi Tom,

I'm reviewing the SS and just wanted to confirm that I've capture the required specs correctly below in the comparison matrix for my understanding. Can you please also confirmed if the below suppliers listed are the only one out the marketplace that can provide a similar MHz laser system? There's no one else?

| Specifications Requirements | Light Conversion | Coherent | Ultrafast Systems |
|---|---|---|---|
| High pulse Energy (>mJ) and short duration (~100fs) | YES | No | No |
| Need Optical Parametric Amplifiers (OPAs) to enable experiments to be performed over a wide range of wavelengths, from UV to IR. | YES | ? | Yes |
| Transient absorption spectrometer that will enable fast 'plug and play' measurements. | YES | No | Yes |

Thanks,

**Trinh Nguyen**
Procurement Specialist
**Knights Experience Team (kNEXT)**
University of Central Florida
Trinh.Nguyen@ucf.edu
☏ 407-823-5889
ucf.edu • kNEXT.ucf.edu • Workday Help

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**From:** Noha Bukatwa <Noha.Bukatwa@ucf.edu>
**Sent:** Wednesday, January 8, 2025 3:57 PM
**To:** Tom Hopper <thomas.hopper@ucf.edu>; Trinh Nguyen <Trinh.Nguyen@ucf.edu>
**Subject:** RE: UCF-TH - PO status? [quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)]

Thank you for your email, Tom.

**Trinh** – please provide updates regarding Tom Hopper's Sole Source, case# C0111033

Noha

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**From:** Tom Hopper <thomas.hopper@ucf.edu>
**Sent:** Wednesday, January 8, 2025 3:50:45 PM
**To:** Noha Bukatwa <Noha.Bukatwa@ucf.edu>
**Subject:** Fw: UCF-TH - PO status? [quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)]

Hi Noha,

Happy New Year!

Are there any developments on the sole source and start-up funds?

Best

Tom

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**From:** Andrey Senin (LC) <Andrey@LightCon-USA.com>
**Sent:** Wednesday, January 8, 2025 15:06
**To:** Tom Hopper <thomas.hopper@ucf.edu>
**Subject:** UCF-TH - PO status? [quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)]

Hi, Tom – Happy New Year!

We have not heard from the UCF procurement yet.

Have you managed to launch the purchasing process? Do you know when we should expect to receive the PO?

Thank you, and looking forward to hearing from you

Andrey

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**From:** Andrey Senin (LC)
**Sent:** Thursday, December 12, 2024 10:43 PM
**To:** Tom Hopper <thomas.hopper@ucf.edu>
**Subject:** RE: UCF-TH - quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)

Done, Tom!

See a separate email with the quote. Pls review it and let me know if there are any questions

Thank you,

Andrey

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**From:** Andrey Senin (LC)
**Sent:** Wednesday, December 11, 2024 9:06 PM
**To:** Tom Hopper <thomas.hopper@ucf.edu>
**Subject:** RE: UCF-TH - quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)

Dear Tom,

To update you – I expect to digest the final input from HQ tomorrow (it's been extremely busy at our end), and then should be able to push the quote thru the system on/by Friday

Thank you for your patience and understanding,

Andrey

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**From:** Andrey Senin (LC)
**Sent:** Wednesday, December 4, 2024 11:48 PM
**To:** Tom Hopper <thomas.hopper@ucf.edu>
**Cc:** Lucian Hand (LC) <Lucian@LightCon-USA.com>
**Subject:** RE: UCF-TH - quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)

Dear Tom,

Great to hear from you, and welcome to Florida!

Sure - I am checking with our HQ on a few details and then will get you the updated quote.

Thank you, and in touch

Andrey

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**From:** Tom Hopper <thomas.hopper@ucf.edu>
**Sent:** Tuesday, December 3, 2024 8:51 PM
**To:** Andrey Senin (LC) <Andrey@LightCon-USA.com>
**Cc:** Lucian Hand (LC) <Lucian@LightCon-USA.com>; Rex Rosandich (LC) <Rex@LightCon-USA.com>
**Subject:** RE: UCF-TH - quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)

Dear Andrey,

I now have access to my UCF email and startup funds. Can you please send an up-to-date quote for the Pharos 2 mJ 20W 1 MHz system with the Orpheus MIR, Orpheus VIS and HARPIA TA? I would like to place the order before the Christmas break.

Many thanks

Tom

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**From:** Andrey Senin (LC) <Andrey@LightCon-USA.com>
**Sent:** Monday, August 5, 2024 23:28
**To:** Tom Hopper <trh@stanford.edu>
**Cc:** Lucian Hand (LC) <Lucian@LightCon-USA.com>; Rex Rosandich (LC) <Rex@LightCon-USA.com>
**Subject:** UCF-TH - quote Q240802-AS4 Pharos-SP-2mJ-20W-1MHz_Orpheus-MIR_Orpheus-VIS_HARPIA-TA-UV-VIS-NIR (UCF-TH)

Dear Dr. Tom Hopper,

Per your request, attached please find the quote for the Pharos-2mJ-20W-1MHz_Orpheus-VIS_Orpheus-MIR_HARPIA-TA-UV-VIS-NIR spectroscopy system.

Could you please review this quote and let me know any questions you may have.

Thank you and looking forward to hearing from you,

Andrey Senin, Ph.D

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Director, Ultrafast Scientific

Light Conversion-USA

(833) 685-2872 x118

www.LightCon.com

201 South Wallace, Suite B-2C | Bozeman, Montana 59715
tel 833.685.2872 | fax 833.395.2872 | www.LightCon.com

**Quote #: Q240802-AS4a**

*December 12, 2024*

**Prof. Tom Hopper**
Department of Chemistry
University of Central Florida
4111 Libra Dr., Orlando, FL 32816

Dear Dr. Tom Hopper,
Following is the quotation for the Pharos-2mJ-20W-1MHz_Orpheus-VIS_Orpheus-MIR_HARPIA-TA-UV-VIS-NIR spectroscopy system. Key features and specifications include:

- PHAROS pump laser has been engineered for applications where reliability is crucial. It represents 'best in class' stability and a robust design. This laser is modular, and so it can be repaired or refurbished without a need to ship the entire system back to the factory. The CPA design with computer-controlled stretcher/ compressor allows the user to control the pulse duration from a computer. Tunability of the laser output parameters allows PHAROS system to cover applications normally requiring different classes of lasers.
- ORPHEUS-VIS is an optical parametric amplifier (OPA) optimized for the efficient generation of broadband UV, Vis and NIR pulses.
- ORPHEUS-MIR is a two-channel OPA, followed by a difference frequency generation (DFG) stage and optimized for the efficient generation of broadband mid-IR pulses (<100 fs in duration).
- HARPIA spectrometer is fully ready for the transient absorption measurements and comes with measurement automation and data analysis software.
- The entire system has been designed to allow customers to use the laser as a tool, maintaining focus on their work. It is thoroughly tested at production site and debugged there to ensure best performance at installation.
- The system is equipped with an extensive software package, which ensures smooth operation as well as remote system monitoring and troubleshooting.

We have designed the system to be flexible, and are happy to work with you over time to update or reconfigure the system to accommodate evolutions in your work.
We appreciate the opportunity to work with your group, please let me know if you have any questions.

Best Regards

Andrey Senin, Ph.D.
Light Conversion-USA
Andrey@LightCon-USA.com
(833) 685-2872 x118

LIGHT CONVERSION USA

201 South Wallace, Suite B-2C | Bozeman, Montana 59715
tel 833.685.2872 | fax 833.395.2872 | www.LightCon.com

**Quote #: Q240802-AS4a** *December 12, 2024*

**Prof. Tom Hopper**
Department of Chemistry
University of Central Florida
4111 Libra Dr., Orlando, FL 32816

| Item | Description | List Price, USD |
|---|---|---|
| PHAROS-SP-2mJ-20W-1MHz | PHAROS-SP-2mJ-20W-1MHz pump laser<br>• ~1030 nm Fundamental Output<br>• 20W max output power (at 10 kHz to 1,000 kHz)<br>• 2 mJ/pulse max output energy (at up to 10 kHz)<br>• < 190 fs fundamental pulse duration<br>• 1 kHz .. 1,000 kHz rep rate<br>• Includes integral pulse picker, which may be used to effectively divide PRR<br>• Includes laser control laptop with an extensive preloaded software package | $ 236,970 |
| ORPHEUS-VIS-WR | ORPHEUS-VIS broad bandwidth OPA with wide tuning range<br>• Tuning range: 320 - 900 nm<br>• Pulse duration:<br>< 50 fs @ 500 – 600 nm, < 55 fs @ 800 - 900 nm, < 70 fs @ 650 - 800 nm<br>• Input energy (power & rep rate): *200 uJ (10 W @ 50 kHz) - pls. confirm* | $ 138,400 |
| ORPHEUS-MIR | ORPHEUS-MIR broad bandwidth optical parametric amplifier<br>• 2500 - 4000 nm (Signal), 4000 - 10000 nm (Idler)<br>< 100 fs pulse duration<br>• ~2000 nm auxiliary output (not tunable) when Signal/Idler are not used<br>< 50 fs pulse duration<br>• Input energy (power & rep rate): *200 uJ (10 W @ 50 kHz) – pls. confirm* | $ 149,210 |
| HARPIA-TA-UV-VIS-NIR | HARPIA-TA-UV-VIS-NIR Ultrafast Transient Absorption Spectrometer<br>(run at 50 kHz, built-in pulse picking – *pls. confirm when ordering*)<br>• Fully ready for transient absorption measurements, in a compact footprint<br>• Includes measurement automation and data analysis software<br>• Sample excitation by the Orpheus-VIS-WR OPA output.<br>Excitation range: 320 – 900 nm.<br>• WLC probe spectral range for transient absorption:<br>350 - 750 nm and 460 - 1600 nm, motorized switching<br>• External motorized monochromator for multichannel detection<br>• Multichannel detector UV-Vis-NIR: 200 - 1100 nm range, and<br>Multichannel detector NIR-SWIR: 900 - 1600 nm range<br>• Delay Stage (8ns): high load capacity, lifetime, maintenance-free operation, and guiding accuracy; stress-relieved aluminum base for high stability.<br>• Motorized sample mover, Berek compensator, and neutral density filters<br>• Temporal resolution: ≤ laser pulse duration or better<br>• Includes required beam splitting & routing optics and hardware with enclosed beam tubes for safety and stability<br>• Includes measurement mode in reflection, a beam profiler, a sample stirrer, a motorized pump mirror. | $ 140,120 |

201 South Wallace, Suite B-2C | Bozeman, Montana 59715
tel 833.685.2872 | fax 833.395.2872 | www.LightCon.com

| | | |
|---|---|---|
| | • System Control and Data Acquisistion Software: user-friendly interface, presets, measurement noise suppression, diagnostics and data export, API for remote experiment control using third-party software<br>• Data Analysis Software: advanced global and target analysis, and data handling (slicing, merging, fitting, smoothing, etc.); probe spectral chirp correction, calibration and deconvolution; support for 3D data sets | |
| | ***Equipment Subtotal:*** | ***$ 664,700*** |
| | Special discount for Prof. Hopper<br>• PHAROS system should be mentioned in published work<br>• Prof. Hopper agrees to be mentioned as a reference | ($ 115,890) |
| | 10% discount for optics, crystals, lasershields & mechanics for the Hopper group within up to 3 months of purchase:<br>• Opto-Mechanics: http://www.standa.lt/support/download<br>• Laser components: http://eksmaoptics.com/catalogues/ | Included |
| | Installation & Training for the PHAROS and OPAs | $ 28,900 |
| | Installation & Training for the HARPIA-TA-UV-VIS-NIR | $ 16,900 |
| | Delivery: to a loading dock by air freight | $ 5,400 |
| | **Total:** | **$ 600,010** |

**NOTE:** Local sales tax will be added unless exemption certificate is provided.

**Terms & Conditions**

- **Price:** US Dollars, DDP Destination
- **Payment:** Net 30, payment by check or wire transfer
- **Delivery:** ~12 months ARO for the Pharos, Orpheus-Vis and Harpia
  ~14 months ARO for the Orpheus-MIR
- **Quotation valid:** 30 days

201 South Wallace, Suite B-2C | Bozeman, Montana 59715
tel 833.685.2872 | fax 833.395.2872 | www.LightCon.com

**CLASS IV LASER SYSTEM: User is responsible for compliance with all local codes and regulations.**

**Product Warranty:** Seller warrants to Buyer that the Products shall be substantially free from defects in materials and workmanship under normal use and service for one (1) year from the date of shipment from the factory.

Buyer's exclusive remedy and Seller's sole liability for any breach of the foregoing warranty shall be for Seller, at Buyer's request within the warranty period by written notice specifying the defect, and at Seller's sole option, to repair or replace the defective Product or refund any amounts paid for the defective Product.

For on-site warranty service, labor and daily expenses are paid by LC-USA. For on-site service, typical response time is 2-4 weeks. If immediate service is needed, buyer agrees to pay for airfare.

These remedies are available only if Seller's examination discloses to Seller's satisfaction that such defects actually exist and were not caused by Buyer's misuse, abuse, unauthorized modifications or disassembly, neglect, attempts to repair, or by accident, fire, third party materials or other hazard. It is buyer's responsibility to perform periodic maintenance including periodically inspecting OPA optics, cleaning as-needed. Repair or replacement of a part does not extend the warranty period beyond the initial warranty period, which commences with the date of shipment.

Seller makes no representation or warranty that the Products supplied hereunder comply with any local laws or ordinances, and Buyer has the responsibility for compliance with local laws and ordinances, including obtaining all permits, licenses, authorizations or certificates required by any regulatory body for installation or use of the Products.

**Service Warranty:** Services shall be performed consistent with generally prevailing professional and industry standards. Buyer's exclusive remedy and Seller's sole liability for any breach of the foregoing warranty shall be the re-performance of the applicable Services, failing which Seller shall refund the portion of fees paid which relate to the specific non-conforming Services.

**No Other Warranties:** To the maximum extent permitted by applicable law, the Seller and its suppliers disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with regard to the software and any related or accompanying written materials. No liability for damages, to the maximum extent permitted.

**Laser Safety:** Laser safety training is not provided by LC-USA. It is imperative that the customer obtain laser safety training from a qualified Laser Safety Officer, and ensure that lasers are operated in a safe manner and in compliance with applicable regulations. We offer training on use and maintenance of the systems we sell. However, this training does not substitute for laser safety training.

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## Technical Specifications

- *See product brochure for detailed specifications,* www.LightCon.com and sample test report enclosed

**High Energy & High Power Femtosecond DPSSL System PHAROS-SP**

- Yb lasing medium
- All solid state diode pump technology
- Sealed oscillator and regenerative amplifier modules

| | |
|---|---|
| Fundamental Wavelength | 1030 +/- 10 nm |
| Pump Laser Output Power, 1030 nm | 20 W maximum output power |
| Pulse energy | 2 mJ maximum output energy |
| Pulse Width (FWHM) : | < 190 fs |
| Pulse duration range | 190 fs – 10 ps |
| Repetition rate tunable in the range of | 1 kHz to 1 MHz (lower repetition rates available using Pulse Picker) |
| Pulse selection | Single-Shot, Pulse-on-Demand, any base repetition rate division |
| Output beam quality | $M^2$<1.3 |
| Beam pointing stability | <20 µrad / °C |
| Output pulse-to-pulse stability | < 0.5 % nrmsd over 24 hours (under stable environmental conditions) |
| Power stability | < 0.5 % nrmsd over 100 h |
| Polarization | Linear, horizontal |
| Diode Lifetime | >10k Hours |
| Laser settings and functions | PC controllable |
| Laser diagnostics | available through PC interface |

| | |
|---|---|
| Powering | 120 VAC or 208 VAC, single phase, <2 kW |
| Safety | Includes interlock and emergency stop connections |
| Power Supply | Integrated in the laser head |
| Cooling: | Air-cooled or water-cooled chiller is included (choose when ordering) |

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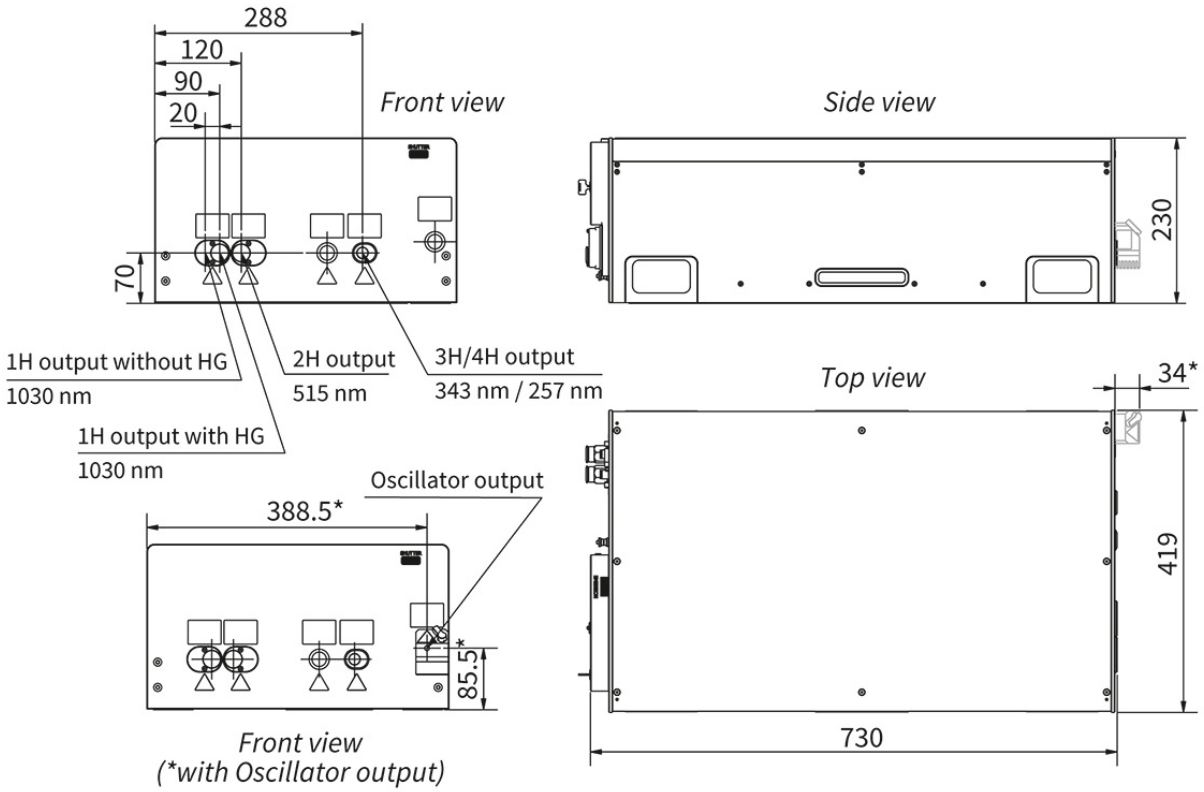
## Pharos DPSS Laser (PH2)



## Pharos Technical Drawing, mm

(Note: available outputs depend on the quoted configuration – see page 2)



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## ORPHEUS-VIS-WR OPA specifications

| Model | ORPHEUS-VIS-WR |
|---|---|
| Tuning range | 320 – 900 nm |
| Maximum pump power | 20 W |
| Pump pulse energy | 200 – 1,000 µJ |
| Conversion efficiency<br>(percentage of the pump power) | > 1.5% @ 500 nm<br>> 5.0% @ 660 nm<br>> 0.5% @ 350 nm |
| Pulse duration | < 50 fs @ 500 – 600 nm<br>< 55 fs @ 800 – 900 nm<br>< 70 fs @ 650 – 800 nm |
| Spectral bandwidth (FWHM) | 200 – 700 $cm^{-1}$ |
| Long-term power stability, 8h | < 2% nrmsd @ 500 nm |

**Pump Laser Requirements**

| Parameter | Value |
|---|---|
| Wavelength | 1030 nm |
| Pump energy | 200 – 1,000 µJ |
| Pump power | up to 20 W |
| Pulse duration (FWHM) | < 190 fs |

Sample tuning curves can be found at http://toolbox.lightcon.com/tools/tuningcurves/
Layout planner tool can be found at http://toolbox.lightcon.com/planner

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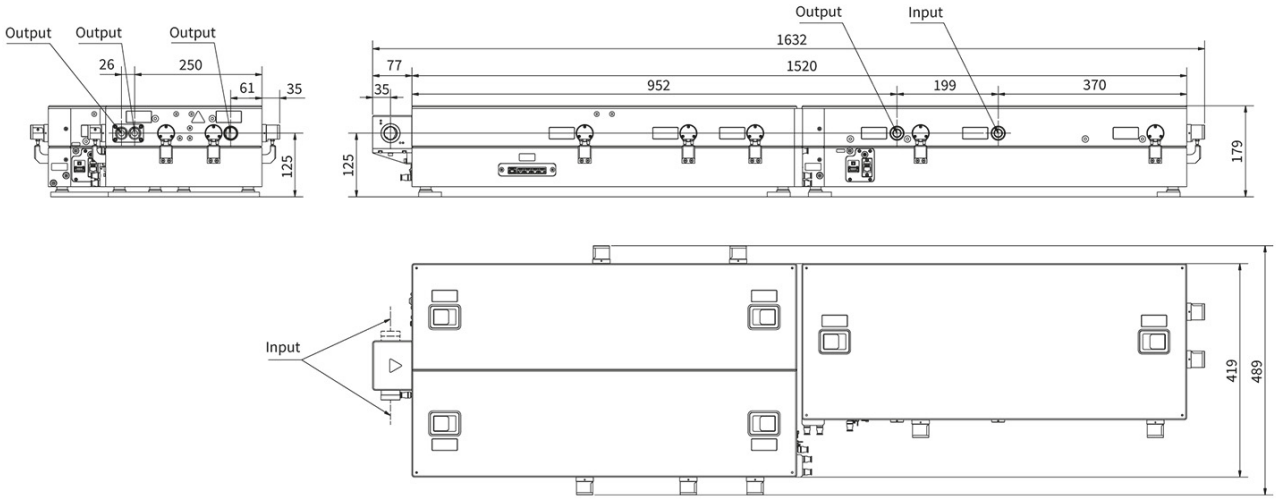
## ORPHEUS-VIS OPA drawing (mm)

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## ORPHEUS-MIR OPA specifications*

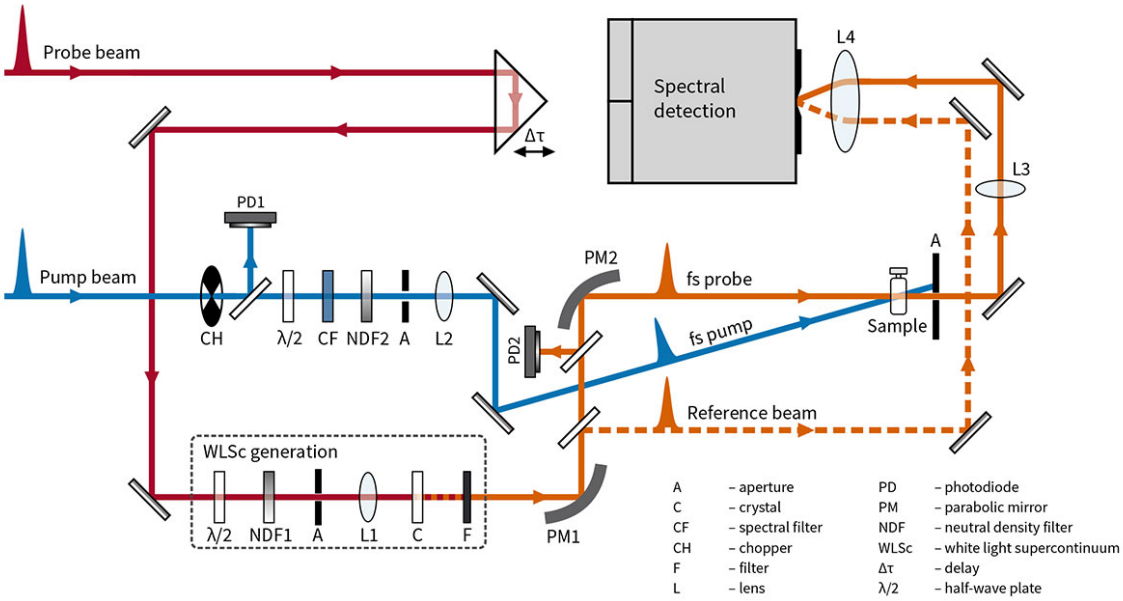
| | |
|---|---|
| Tuning range | 2500 - 4000 nm (Signal) and 4000 - 10000 nm (Idler) |
| Conversion efficiency | >1.2% @ 3000 nm, >1.0% @ 3500 nm<br>>0.6% @ 5000 nm, >0.3% @ 9000 nm |
| Spectral bandwidth | >300 $cm^{-1}$ @ 2500 – 4000 nm<br>>200 $cm^{-1}$ @ 4000 – 10000 nm |
| Pulse duration | < 100 fs |
| Long-term power stability, 8 h<br>(normalized root mean squared deviation) | < 2% @ 5000 nm |
| Pulse-to-pulse energy stability, 1 min<br>(normalized root mean squared deviation) | < 2% @ 5000 nm |
| Auxiliary Output<br>(~2000 nm; when Signal/Idler not used) | ~2000 nm (not tunable, optimized for best overall performance)<br><50 fs pulse duration, >350 $cm^{-1}$ pulse bandwidth<br>>8% conversion efficiency |

Notes: * conversion efficiency specified as the percentage of input power to ORPHEUS-MIR.
Output beam is diverging. Divergence depends on input energy to the OPA. End-users are to take care of any needed collimation based on particular experimental requirements.
GaSe crystal used in this OPA is uncoated (for robust performance), and so low-intensity reflection-induced side pulses are present in the output. End-users are to ensure usability of such output for intended experiments.
ORPHEUS-MIR requires some space after its output to allow for spatial separation of three output beams (signal, idler and auxiliary): ~0.5 meter is recommended. An end-user is to implement blocking/unblocking of the beams depending on which one is needed for experiments

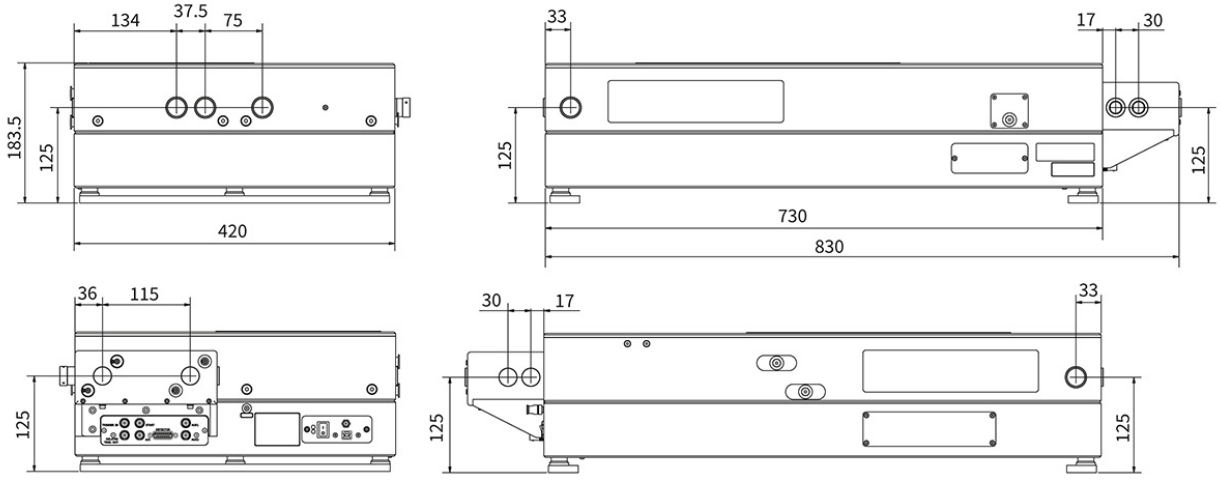
## Pump Laser Requirements

| **Parameter** | **Value** |
|---|---|
| Wavelength | 1030 nm |
| Pump energy | 200 µJ – 2 mJ |
| Pump power | up to 20 W |
| Rep rate | up to 100 kHz |
| Pulse duration (FWHM) | <190 fs |

## HARPIA-TA optical layout




## HARPIA-TA drawing (mm)



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## SOFTWARE

### HARPIA Service APP – System Control and Data Acquisistion Software

A single software solution for all measurement modes, featuring:

- User-friendly interface
- Measurement presets
- Measurement noise suppression
- Diagnostics and data export
- Continuous support and updates
- API for remote experiment control using third-party software (LabVIEW, Python, MATLAB)

### CARPETVIEW – Data Analysis Software

An ultrafast spectroscopy data analysis software, featuring:

- Advanced data handling: slicing, merging, cropping, smoothing, fitting, etc.
- Advanced global and target analysis
- Probe spectral chirp correction, calibration and deconvolution
- Support for 3D data sets (2D electronic spectroscopy, fluorescence lifetime imaging)
- Publication-ready figure preparation and data export

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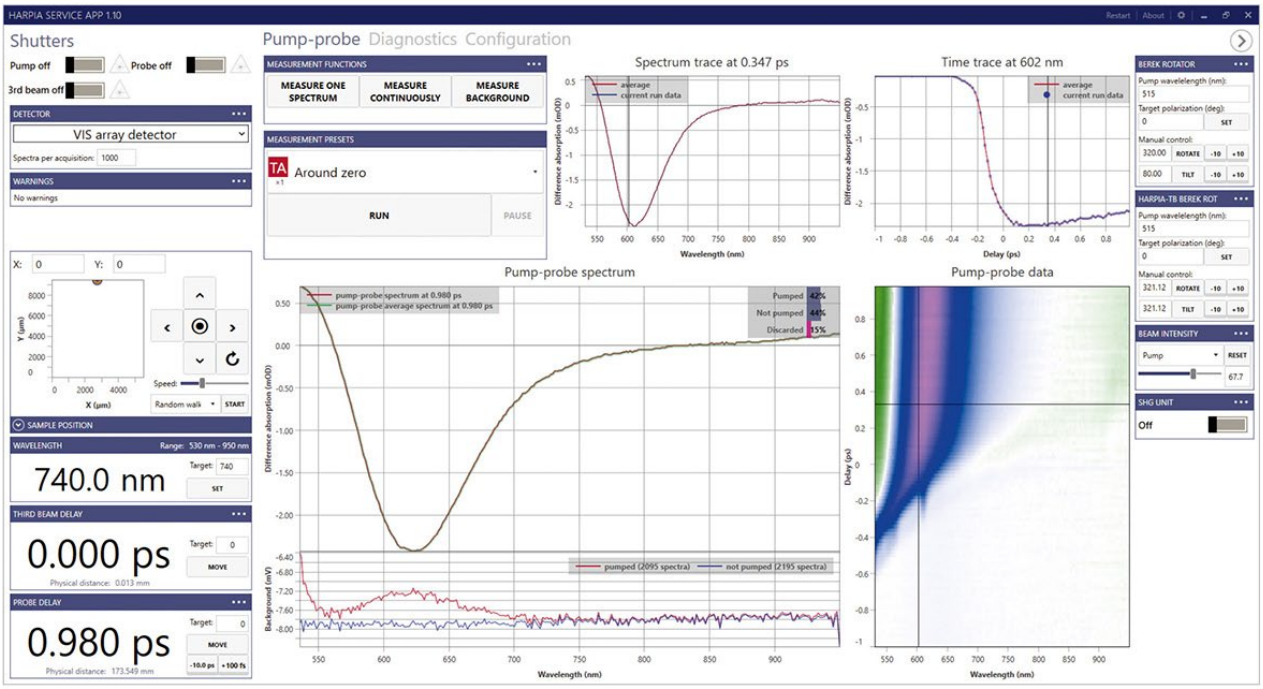
## HARPIA Service App main window




## CARPETVIEW main window