UNIVERSITY of SOUTH FLORIDA

SINGLE SOURCE CERTIFICATION

Authority is requested to make the following purchase under the provision of USF System Regulation USF4.02010(IV)(A)(2)(b) as a non-competitive purchase available from only one source. By submitting this form, department acknowledges that existing exemptions will not apply to this purchase. Single source requests exceeding $75,000 must be signed by a Procurement Director and posted publicly for (3) business days.

DATE: 12/09/2022

ITEM(S): PHAROS-4mJ-20W-200kHz, ORPHEUS-MIR, etc

PRICE: $ $ 387,930 **FUND #:** TPA 10009 0157750

SUPPLIER ID: **REQUISITION#:**

SUPPLIER NAME: Light Conversion

FEDERAL GRANT: ○ Y ◉ N

In your words, describe the equipment, commodity, or contractual service. Explain how these specifications are essential to the accomplishment of your work:

Please see the attached justification.

In your own words, describe the reason(s) the item is not subject to competition from other sources and how the stated specification(s) restrict the requisition to only one supplier. Description may include unique features/compatibility/specifications/availability/delivery time frame etc. (Note: Price is not a valid reason).

Please see the attached justification.

In your own words, describe the due diligence conducted to validate this supplier as Single Source. Description SHOULD list all other suppliers with item(s)/service(s) with similar functions, your efforts to identify other suppliers, and why these suppliers would not qualify to submit a competitive quote.

Please see the attached justification.

DocuSigned by:
Brieanne Matier
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12/20/2022 | 14:11 EST

START 12/20/2022 END 12/23/2022

Approved By (Procurement) **DATE** **PUBLIC POSTING DATES**

Authority: USF4.02010(IV)(A)(2)(b)

Last Modified: 05/10/2021

- The PHAROS laser is based on Yb doped crystal lasing medium (in both oscillator and regenerative amplifier) and has solid state design with Kerr-lens mode locking for long-term serviceability and reliability.

- In the PHAROS, there is no fiber involved at all (vs. competition's fiber-based MOPA architecture and all-fiber solutions), which gives unmatched combination of:

    - **high max energy of 4 mJ/pulse at up to 5 kHz**
    - high pulse-to-pulse stability of <0.5% rms
    - high power stability of <0.5% rms
    - high beam pointing stability of < 20 µrad/°C
    - short pulses (<250 fs) of stable duration

- Pulse duration of <250 fs is achieved directly out of the laser, without employing any non-linear techniques for bandwidth expansion with post-compression. Thus, there is no added complexity to the laser systems to achieve < 250 fs. As there is no nonlinear step with post-compression, the lasers's reliability and stability are not compromised. There are no beam/phase distortions. The same pulse duration is achieved at all power/energy levels.

- Having such short pulses with **high energies and high stability** from the PHAROS laser is important for driving harmonic generators and OPAs, for example, to achieve high output energies, optimal conversion efficiency and most stable output to match the requirements of highly sensitive experiments (**since an OPA is a passive device, its stability is influenced by stability of the pump laser**)

- **Ability to add the 2nd optically synchronized Pharos head in future**. This is a cost-effective solution to add additional set-ups in the future and also would allow to design a set-up using long time pump-probe delays.

- PHAROS, as solid-state laser, has certain distinct advantages over a fiber laser. In particular, it has **very clean pulses with no pulse pedestal**, giving substantially better parametric conversion than is typically possible with fiber lasers. Furthermore, being solid-state with discrete components means that PHAROS can be serviced as-needed, providing an **indefinite serviceable lifetime**.

- While **comparing PHAROS with Ti:Sapphire lasers**, it should be noted that PHAROS Yb lasers are directly diode pumped, and so are made **compact and robust**. Ti:Sapphire systems are notoriously large, and tend to require substantial alignment & maintenance. They are also more sensitive the environmental fluctuations. They have to be pumped by frequency doubled IR lasers, so there is a pump laser for the oscillator, another one for the regenerative amplifier, and additional for the amplification stage(s).

- A very important aspect of the PHAROS system is that it can work well at **both low rep rates (1 kHz) and at high rep rates (e.g. 100 kHz)**, while Ti:Sapphire lasers generally struggle at high rep rates due to thermal effects and can reach typically up to 10 kHz rep rate.

- **Ability to pump more than one OPA/NOPA and add OPA**s in future since PHAROS laser produces plenty of energy for this (about 2 times more than the Ti:Sapphire system from Coherent and Spectra Physics). Light Conversion has **pioneered and dominated the OPA market** since the 90s. It actually produces the OPAs that are in the offers by the other two companies ("Coherent" and "Spectra

Physics", named Opera and Spirit, correspondingly). Thus, it is advantageous to buy the OPA directly from LC.

- The state of the art, **Yb-laser pumped, broadband mid-IR Orpheus-MIR OPA**, producing <100 fs pulses with 200 cm^{-1} bandwidth directly at its output, is **not available through the other laser companies**

Light Conversion launched the Yb-based PHAROS system about 15 years ago, one of the first on market, and is several years ahead of competition particularly considering higher energy outputs. They the leaders in OPA design and reliability. Thus, the particular combination of pump laser and OPAs, purchased directly from Light Conversion is advantageous as the complete system will be tested at the production site to ensure best performance at installation. Moreover, the service and support will come from one company and will be available for years.