



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: Physics Contact & Phone: Ryan Ogliore 425-298-3313

Product/Service Cost: \$425,843.62

☒ One Time Purchase ☐ Term Contract: _____

☐ Multiple Purchases ☐ Duration: _____

Company Name: Teledyne Email: lucas.smith@teledyne.com

Contact Person: Lucas Smith Title: Sales Representative

Product and/or Service: Femtosecond laser ablation system

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.

Ryan Ogliore
Digitally signed by Ryan Ogliore
Date: 2026.09.04 08:38:37
+04'00'

Signature

Ryan Ogliore, PI

Printed Name and Title (PI/Researcher/Director/Chair)

09/04/2026

Date

Joshua Colwell
Digitally signed by Joshua Colwell
Date: 2026.09.15 14:00:49
+04'00'

Signature

Joshua Colwell, Dean

Printed Name and Title (President/Vice President/Dean)

(Delegations not allowed; emails from absent approvers are acceptable)

9/15/2026

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.

Stefanie Jollie DelGiudice

Signature

Stefanie Jollie DelGiudice, Procurement and Contracts Specialist

Printed Name and Title (Procurement Specialist)

10/13/2026

Date

via e-mail

Signature

Brian Sargent, Manager of Procurement

**Printed Name and Title
(Procurement Services Manager or Associate Director)**

10/14/2026 4:14 PM

Date

via e-mail

Signature

Joel Levenson, Assistant Vice President, Tax Payables and Procurement

**Printed Name and Title
(Asst. Vice President for Tax, Payables & Procurement)**

10/15/2026 9:36 AM

Date

via e-mail

Signature

Bert Francis, Interim Vice President and Chief Financial Officer

Printed Name and Title (Chief Financial Officer)

10/15/2026 10:57 AM

Date

POSTING NOTICE

10/15/2026 4:00 PM

Date/Time Posted

10/19/2026 4:01 PM

Posting End Date

2703

UCF Control No.

Stefanie DelGiudice

Procurement Specialist

Stefanie DelGiudice

From: Albert Francis
Sent: Thursday, October 15, 2026 10:57 AM
To: Joel Levenson
Cc: Brian Sargent; Stefanie DelGiudice; Nellie Nido
Subject: Re: C0187611_Sole Source_Teledyne

I agree as well, thanks Joel!

Bert

Bert Francis, CPA

Interim Vice President and Chief Financial Officer
Division of Finance
University of Central Florida
4635 Andromeda Loop N
MH384
Orlando, FL 32816
Tel: (407) 882-1075
Email: Albert.Francis@UCF.Edu

From: Joel Levenson <Joel.Levenson@ucf.edu>
Sent: Thursday, October 15, 2026 9:36 AM
To: Albert Francis <Bert.Francis.III@ucf.edu>
Cc: Brian Sargent <Brian.Sargent@ucf.edu>; Stefanie DelGiudice <Stefanie.DelGiudice@ucf.edu>; Nellie Nido <nellie.nido@ucf.edu>
Subject: FW: C0187611_Sole Source_Teledyne

Good morning Bert,

I also support this sole source. After researching the specification requirements the requested equipment is the only one we've been able to find that will satisfy those. Pricing is reasonable, based on comparisons to other laser systems.

If you agree, reply all and indicate as such. If you have additional questions, let me know.

Thank you,

From: Brian Sargent <Brian.Sargent@ucf.edu>
Sent: Wednesday, October 14, 2026 4:14 PM
To: Joel Levenson <Joel.Levenson@ucf.edu>
Cc: Stefanie DelGiudice <Stefanie.DelGiudice@ucf.edu>; Nellie Nido <nellie.nido@ucf.edu>
Subject: FW: C0187611_Sole Source_Teledyne

Hi Joel,

I also support this sole source to Teledyne for a femtosecond laser. Research conducted includes interviews with colleagues at other institutions.

There are only two lasers that integrate with the Nu Sapphire and Vitesse instruments, which UCF already owns or has purchased. Teledyne and ESL. But as reported in the SS, ESL's integration is limited, and also does not meet the following mandatory requirements:

- 2 µm spot size without rastering,
- operation above 1 kHz at full power,
- full integration of the Pharos PH2 light-engine firmware and customizable spot-size adjustment.

We asked him to research other known laser suppliers (known to UCF from previous purchases), and none can integrate with the Nu systems (which is mandatory), and also fall short of other requirements,

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

Regards,

Brian

From: Stefanie DelGiudice <Stefanie.DelGiudice@ucf.edu>

Sent: Tuesday, October 13, 2026 2:13 PM

To: Brian Sargent <Brian.Sargent@ucf.edu>

Cc: Nellie Nido <nellie.nido@ucf.edu>

Subject: C0187611_Sole Source_Teledyne

Recommendation for Approval

I recommend approval of this sole source request based on the department's responses and supporting documentation.

Questions 1-3: Product Description, Market Research, and Sole Source Justification

The department clearly identified the need for a femtosecond laser ablation system to support research using the Nu Sapphire XD and Nu Vitesse mass spectrometers. Market research included evaluation of the Teledyne Iridia, ESL Femto, and Applied Spectra J200 systems, as well as discussions with current users at peer institutions. The analysis demonstrated that both ESL and Applied Spectra failed to meet multiple mandatory requirements, including critical performance and integration capabilities. Based on the documented technical requirements and compatibility needs, Teledyne Iridia was determined to be the only evaluated solution that satisfies all required specifications.

Question 4: Resellers/Distributors

The department confirmed that no resellers or distributors are available for this purchase, and Procurement's review identified no information to contradict that representation.

Question 5: Future Obligations

The department confirmed that the purchase does not create any future licensing, maintenance, or ongoing purchasing obligations that would impact the sole source determination.

Question 6: Price Reasonableness

Price reasonableness was established through a competitive comparison with ESL. The Teledyne proposal is approximately \$5,694 higher than the ESL quote while providing additional accessories and a two-year warranty compared to ESL's one-year warranty. Given the minimal price difference and enhanced value offered, the proposed pricing is considered fair and reasonable.

Procurement Recommendation

The department has adequately demonstrated that the Teledyne Iridia system is the only identified solution that meets all mandatory technical, operational, and compatibility requirements. Market research was conducted, alternative products were evaluated, and pricing was determined to be fair and reasonable. Therefore, I recommend approval of the sole source request.

Best Regards,
Stefanie

Stefanie Jollie DelGiudice
Legal Studies, BA - 2000

Procurement and Contract Specialist
kNEXT Procurement Team
Knights Experience Team (kNEXT)

University of Central Florida
Division of Administration and Finance
3544 Perseus Loop #160975
Building 16F
Orlando, FL 32816-0975

☎ 407-882-2104

Stefanie.DelGiudice@ucf.edu

ucf.edu | kNEXT.ucf.edu | [Workday Help](#)

Please note: Florida has a very broad open records law (F.S. 119). Emails may be subject to public disclosure.

Procurement Assignments:

Advertising, Broadcasting, Promotional Items, Printing, Mail/Mail Services, Books, Educational Supplies, Musical Instruments, Office Supplies/Services, Recreation Equipment, Perquisites/Uniforms, Memberships, Food and Beverage Supplies/Services, Facilities Materials/Supplies, Travel

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.

This femtosecond laser system will be used to ablate material and deliver it to the Nu Sapphire XD and Nu Vitesse mass spectrometers. The femtosecond laser pulse delivers energy to the sample so fast that material is ablated without heating, yielding excellent results in the measurements with the mass spectrometer.

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

I require the femtosecond laser "cold ablation" to get the best data (highest fidelity compared to what is in the sample). I require a laser spot size down to 2 micrometers for my work on small extraterrestrial materials (comet dust and presolar grains). I require a system to work both at high speed (mapping on the Vitesse) and low speed and high precision (spot measurements on the Sapphire XD). I require precise mapping abilities with very precise stage movement. The laser must maintain power at high repetition rates (>1 kHz) for depth profiling and high-speed mapping.

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	Teledyne Iridia	ESL
2 μ m spot size without rastering	Yes	No
>1 kHz at full power	Yes	No
High-speed mapping	Yes	Limited
Precision spot analysis	Yes	Limited
Integration with Nu Vitesse	Yes	Yes
Integration with Nu Sapphire XD	Yes	Yes
Full integration of Pharos PH2 light engine firmware	Yes	No
High sensitivity ablation chamber for high-speed and low-speed analyses	Yes	No
Customizable laser spot size adjustment for small-spot or large-spot analyses	Yes	No
Ability to change laser repetition rate during analytical session	Yes	No

The other competitive laser system is from ESL I looked at that system and talked to my colleagues that have one. This system is not able to produce a small spot size without rastering or scanning, and cannot run at high repetition rate (> 300 Hz) at full power.

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.)

The ESL and Teledyne systems are the only femtosecond laser system that are well integrated with the mass spectrometers I am also purchasing. The two systems that I am purchasing are the Nu Vitesse and Nu Sapphire XD. Applied Spectra also makes a femtosecond system, and it appears to be a good system, but these were the only two laser systems that Nu told me (when I visited the factory) had the best integration.

As described above, the ESL system cannot run at full power at high repetition rate, meaning it does not perform well for high-speed mapping or high-speed depth profiling. It can achieve a small spot size but only during a raster, which means I cannot analyze the small samples, which is a cornerstone of my work (and the main point of laser-ablation work).

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?

No.

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

N/A

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.

Initially, the Teledyne system was significantly more expensive than the ESL system. However, Teledyne agreed to match ESL's pricing and also included an additional year of warranty coverage.

The attached ESL quote totals **\$420,150**. The current Iridia quote is **\$425,844**; however, it includes several additional accessories. As a result, I consider the pricing between the two systems to be effectively equivalent and not a meaningful differentiator. Prior to Teledyne's price adjustment, the ESL system was approximately **\$45,000 less expensive**, which prompted me to request that Teledyne match the ESL pricing.

With respect to warranty coverage, the Teledyne system includes a **two-year warranty**, while the ESL system includes a **one-year warranty**.

Question: The justification (#3)- ESL and Teledyne were compared based on the requirements, ESL doesn't meet the need. These two products were recommended by the manufacturer of the Nu systems, but was any research done in addition to the supplier recommendation?

Answer: Yes, I talked to my colleagues that own both systems. For ESL that was University of Chicago and Caltech. For Teledyne, that was Naval Research Laboratory and Washington University in St. Louis. They all confirmed for me the limitations of the ESL systems that would be bad for my applications: the inability to do single-spot analyses and the fall-off in power at high laser repetition rates

Question: Is the Nu Sapphire and Vitesse products owned UCF equipment? Or a planned purchase for a later date?

Answer: The Vitesse is purchased and will be delivered this week. I hope to purchase the Sapphire XD this week. These two items were approved for purchase under Sole Source Certification 2701 on 07/08/2026.

Question: Please research other laser suppliers we've used – Amplitude, Thorlabs, Spectra Physics, TOPTICA, etc. – in addition to the two suppliers recommended by Nu. Are you able to research these suppliers?

Answer: I can do this but only those two lasers (Elemental and Teledyne) are integrated with the mass spectrometers. Femtosecond lasers are available from other suppliers, such as Amplitude, Thorlabs, Spectra Physics, TOPTICA. However, these systems do not have tight software and hardware integration with our two mass spectrometers from Nu (Vitesse and Sapphire XD). Without the software integration, we would not be able to precisely time the laser ablation event with the analysis, and the resulting precision would be unacceptable. With hardware, we require two important components separate from the laser: 1) A precision, encoded stage that has sub-micrometer reproducibility to allow for precise laser-ablation mapping, and 2) Ablation cells that transport the analyte to the mass spectrometer. These are specially designed to maximize the useful yield of the measurement.

Question: Add applied Spectra to the chart in Question 2 and state Y/N whether they meet our required specifications.

Answer: For adding the Applied Spectra J200 femtosecond system to the comparison chart:

2 µm spot size without rastering	No
>1 kHz at full power	No
High-speed mapping	Limited
Precision spot analysis	Yes
Integration with Nu Vitesse	Limited
Integration with Nu Sapphire XD	Limited
Full integration of Pharos PH2 light engine firmware	No
High sensitivity ablation chamber for high-speed and low-speed analyses	Limited
Customizable laser spot size adjustment for small-spot or large-spot analyses	No
Ability to change laser repetition rate during analytical session	Limited

Femtosecond Laser System Comparison

Required Specifications	Teledyne Iridia	ESL	Applied Spectra J200
2 µm spot size without rastering	Yes	No	No
>1 kHz at full power	Yes	No	No
High-speed mapping	Yes	Limited	Limited
Precision spot analysis	Yes	Limited	Yes
Integration with Nu Vitesse	Yes	Yes	Limited
Integration with Nu Sapphire XD	Yes	Yes	Limited
Full integration of Pharos PH2 light engine firmware	Yes	No	No
High-sensitivity ablation chamber for high-speed and low-speed analyses	Yes	No	Limited
Customizable laser spot-size adjustment for small-spot or large-spot analyses	Yes	No	No
Ability to change laser repetition rate during analytical session	Yes	No	Limited

Evaluation Narrative

In addition to the ESL Femto system, the PI evaluated the Applied Spectra J200 femtosecond laser system. While the Applied Spectra system provides precision spot-analysis capability, it does not meet several mandatory requirements, including a 2 µm spot size without rastering, operation above 1 kHz at full power, full integration of the Pharos PH2 light-engine firmware, and customizable spot-size adjustment. Its high-speed mapping, high-sensitivity ablation-chamber capability, repetition-rate changes during an analytical session, and integration with the Nu Vitesse and Nu Sapphire XD mass spectrometers are limited. The ESL system also fails to meet multiple mandatory specifications, including 2 µm spot analysis without rastering, operation above 1 kHz at full power, full firmware integration, required ablation-chamber capabilities, customizable spot-size adjustment, and repetition-rate changes during an analytical session. Accordingly, Teledyne Iridia is the only evaluated system that meets all identified mandatory technical and integration requirements for the intended research applications.

TELEDYNE
IRIDIA Femto



Federal ID No: 95-4888283

Quote No: 00076476 Rev: 9 Print Date: 9/14/2026

Sold To:

University of Central Florida
Finance and Accounting Office
12424 Research Parkway
Suite 300
Orlando, FL 32826-3249
United States

Sales Quotation

Bill To:

University of Central Florida
Finance and Accounting Office
12424 Research Parkway
Suite 300
Orlando, FL 32826-3249
United States

Ship To:

University of Central Florida
Environmental Systems Engineering Institute
Health & Physics - Room 134
4000 Alfaya Trail
Orlando, FL 32816
United States

Customer Reference	Customer Contact	Email	Delivery Terms
	Ogliore, Ryan	ryan.ogliore@ucf.edu	Domestic ONLY-Origin - S&H Added

Quotation Valid Until	Teledyne Contact	Teledyne Phone	Payment Terms	Payment Mode
10/14/2026	Smith, Lucas D	402-889-0500	Net 45	CHECK

SUBMIT ORDERS TO:	Named Destination	Creation Date
Teledyne Photon Machines, 512 East Madison Avenue, Suite 4, Belgrade, MT 59714. Email:PM-LaserSales@teledyne.com		2/26/2026

Line	Item Number	Description	U/M	Quantity	Unit Price	Amount
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SALES TAX (IF APPLICABLE) AND SHIPPING COSTS ARE THE RESPONSIBILITY OF CUSTOMER AND WILL BE ADDED TO FINAL INVOICE. PLEASE NOTE THAT ANY INCLUDED SHIPPING COSTS ARE ESTIMATES AND FINAL SHIPPING CHARGES WILL BE REFLECTED UPON THE FINAL INVOICE

0	33-1300-PH2		ea	1.00	352,000.00	352,000.00
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IRIDIA FEMTO, PH2

Lead time: Days ARO

-199

Discount Applied: 71,477.31

0	33-0690-070		ea	1.00	27,552.50	27,552.50
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ASSEMBLY, COBALT SUPPORT, IRIDIA

Cobalt Sample Chamber including modular sample drawer design

Lead time: Days ARO

-199

0	33-1307-070		ea	1.00	9,597.77	9,597.77
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257nm OPTICS PACKAGE, IRIDIA FEMTO

Lead time: Days ARO

-199

Discount Applied: 1,066.42

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

Continued***

Seller's Offer, and any order issued by Buyer to Seller for the goods and/or services specified herein, is expressly limited to Seller's General Terms and Conditions of Sale, which can be found at www.teledyne.com/what-we-do/terms-and-conditions. Seller objects to any different or additional terms except, in connection with an order in furtherance of a government prime contract, those government contract clauses that are required by law to be incorporated herein.



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4000 Alfaya Trail
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Quotation Valid Until	Teledyne Contact	Teledyne Phone	Payment Terms	Payment Mode
10/14/2026	Smith, Lucas D	402-889-0500	Net 45	CHECK

SUBMIT ORDERS TO:

Teledyne Photon Machines, 512 East Madison Avenue, Suite 4, Belgrade, MT 59714. Email: PM-LaserSales@teledyne.com

Named Destination	Creation Date
	2/26/2026

Line	Item Number	Description	U/M	Quantity	Unit Price	Amount
0	33-0715-070	LONG PULSE CELL Long pulse ablation cell for Cobalt sample chamber: • "Cup" like sample cell <5ms single pulse response for both hard and soft materials • Smoothing device to elongate single pulse response up to <140ms • Dynamic Z drive to maintain distance between sample and ablation cell Lead time: Days ARO -186 Discount Applied: 816.01	ea	1.00	5,694.09	5,694.09
0	33-0710-070	FAST PULSE CELL Short pulse ablation cell for Cobalt sample chamber: • "tube" like sample cell for efficient aerosol removal • <1ms single pulse response for both hard and soft materials • Dynamic Z drive to maintain distance between sample and ablation cell Lead time: 10 Days ARO Discount Applied: 816.01	ea	1.00	5,694.09	5,694.09
0	33-0707-070	COMPLETION KIT, IRIDIA NU INSTRUMENTS VITESSE Lead time: 9 Days ARO Discount Applied: 902.62	ea	1.00	0.00	0.00
0	33-1463-070	ASSEMBLY, COMPLETION KIT, IRIDIA TO NU PLASMA III & SAPPHIRE Lead time: -3 Days ARO Discount Applied: 902.62	ea	1.00	0.00	0.00

These items are controlled by the U.S. Government and authorized for export only to the country of ultimate destination for use by the ultimate consignee or end-user(s) herein identified. They may not be resold, transferred, or otherwise disposed of, to any other country or to any person other than the authorized ultimate consignee or end-user(s), either in their original form or after being incorporated into other items, without first obtaining approval from the U.S. government or as otherwise authorized by U.S. law and regulations.

Continued***

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University of Central Florida
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Health & Physics - Room 134
4000 Alfaya Trail
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10/14/2026	Smith, Lucas D	402-889-0500	Net 45	CHECK
SUBMIT ORDERS TO:			Named Destination	Creation Date
Teledyne Photon Machines, 512 East Madison Avenue, Suite 4, Belgrade, MT 59714. Email:PM-LaserSales@teledyne.com				2/26/2026

Line	Item Number	Description	U/M	Quantity	Unit Price	Amount
0	33-0735-070	UPPER POLARIZER Secondary polarizer that can be added to allow for dual cross polarization Lead time: Days ARO -186 Discount Applied: 281.59	ea	1.00	2,534.28	2,534.28
0	33-1065-024	LASER ABLATION MIXING CHAMBER, CYCLONIC A cyclonic smoothing chamber which lengthens single pulse response times up to 2.5 seconds. Lead time: Days ARO -186 Discount Applied: 177.16	ea	1.00	1,594.44	1,594.44
0	33-0308-075	HDIP MAPPING SOFTWARE (ACADEMIC) 5-year academic license for the HDIPdata interrogation software (2 seats) Lead time: Days ARO -193	ea	1.00	2,624.10	2,624.10
0	33-0770-000	LOW FLOW MFC KIT, 0-50 SCCM, IRIDIA Lead time: Days ARO -186 Discount Applied: 239.74	ea	1.00	5,500.00	5,500.00

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Teledyne Photon Machines, 512 East Madison Avenue, Suite 4, Belgrade, MT 59714. Email:PM-LaserSales@teledyne.com				2/26/2026

Line	Item Number	Description	U/M	Quantity	Unit Price	Amount
0	33-0818-070	INSERT 3 x 1" ROUND Insert for the Cobalt sample drawer incorporating 3 x 26mm, round sample mounts (nominal 1" diameter round). Lead time: 9 Days ARO Discount Applied: 100.00 %	ea	2.00	0.00	0.00
0	33-1208-070	ASSEMBLY, TRANSPARENT DRAWER, IRIDIA Lead time: Days ARO -199 Discount Applied: 209.95	ea	1.00	1,889.55	1,889.55
0	Miscellaneous BZN	Miscellaneous BZN -Extended warranty of Light Conversion laser head to cover the second year of use and to correlate with the Iridia Femto's manufacturer's warranty. Lead time: -4 Days ARO Discount Applied: 7,000.00	ea	1.00	0.00	0.00
0	Miscellaneous BZN	Miscellaneous BZN - Inclusion of an adjustable optic that allows operator to change beam path to allow for obtaining of smaller spots (2um). Optic solution must be "user reversible" such that the original beam path can be restored to optimize beam shape for larger spots. Lead time: -3 Days ARO Discount Applied: 5,500.00	ea	1.00	0.00	0.00

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Continued***

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Federal ID No: 95-4888283

Quote No: 00076476 Rev: 9 Print Date: 9/14/2026

Sold To:
University of Central Florida
Finance and Accounting Office
12424 Research Parkway
Suite 300
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United States

Sales Quotation

Bill To:
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Finance and Accounting Office
12424 Research Parkway
Suite 300
Orlando, FL 32826-3249
United States

Ship To:
University of Central Florida
Environmental Systems Engineering Institute
Health & Physics - Room 134
4000 Alfaya Trail
Orlando, FL 32816
United States

Customer Reference	Customer Contact	Email	Delivery Terms
	Ogliore, Ryan	ryan.ogliore@ucf.edu	Domestic ONLY-Origin - S&H Added

Quotation Valid Until	Teledyne Contact	Teledyne Phone	Payment Terms	Payment Mode
10/14/2026	Smith, Lucas D	402-889-0500	Net 45	CHECK

SUBMIT ORDERS TO:	Named Destination	Creation Date
Teledyne Photon Machines, 512 East Madison Avenue, Suite 4, Belgrade, MT 59714. Email:PM-LaserSales@teledyne.com		2/26/2026

Line	Item Number	Description	U/M	Quantity	Unit Price	Amount
0	INSTALL-LASER-NA		ea	1.00	9,100.00	9,100.00

LASER INSTALLATION, NORTH AMERICA
Onsite installation of Teledyne laser ablation systems. Includes basic operational training, routine maintenance and software usage from factory-trained specialists.

Lead time: Days ARO
-74

Shipping & Handling 2,062.80

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Total Amount 425,843.62 USD

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IRIDIA Femto Critical Technical Requirements and Unique Capabilities

Suggested minimum requirements for advanced femtosecond LA-ICP-MS workflows

General Description

The IRIDIA Femto is a 257 nm femtosecond laser ablation system designed for high-resolution elemental and isotopic analysis, discrete spot analysis, quantitative workflows, depth profiling, and high-speed elemental imaging. The following matrix identifies ten capabilities considered critical to the intended analytical program, explains the scientific or operational importance of each capability, and provides suggested wording that may be used when defining minimum system requirements. The requirements emphasize measurable performance and application flexibility rather than nominal specifications alone. Supporting IRIDIA Femto presentation materials, technical specifications, and pre-installation documentation may be supplied to substantiate directly verifiable points.

IRIDIA Femto Capability	Why the Capability Is Important	Suggested Minimum Requirement
1. High-Repetition-Rate Energy and Stability	High-speed elemental imaging and rapid depth profiling require useful pulse energy and consistent pulse-to-pulse performance at elevated repetition rates. A high nominal repetition rate offers limited analytical benefit if increasing the rate causes a substantial energy reduction. The documented IRIDIA Femto specification identifies 0.5% RSD stability at 1 kHz, while the accompanying energy-and-stability data illustrate operation through 4 kHz without the energy drop that can otherwise restrict high-speed work.	The laser source must provide software-selectable operation from 1 Hz through at least 4,000 Hz. It must demonstrate pulse-energy stability of 0.5% RSD or better at 1 kHz and maintain useful, stable pulse energy as repetition rate increases through 4,000 Hz, without a material energy reduction that limits analytical operation. Representative energy and stability data across the repetition-rate range must be provided.
2. Side-by-Side Crater Verification Across Spot Sizes and Matrices	Consistent crater geometry is essential for controlled material removal, depth profiling, thin-layer analysis, and volumetric calibration. Nominal spot-size claims alone do not demonstrate actual ablation quality. A structured series of adjacent ablations makes it possible to visually assess repeatability, circularity, wall definition, and progression across the available spot-size range without relying on isolated examples.	The vendor must provide microscopy, SEM, interferometry, or profilometry images showing organized, side-by-side series of successive individual ablations produced on the same sample matrix under stated operating conditions. Each series must span representative spot sizes from the minimum routinely available circular spot size through the maximum routinely available circular spot size. Equivalent series must be shown on multiple materially different matrices, including transparent and opaque materials. Images must permit direct visual comparison of repeated craters, crater morphology, and dimensional consistency across the series.
3. Patented Dynamic Z Sample-Surface Tracking	Uneven, tilted, mounted, or non-planar samples can change the distance between the sample surface and aerosol extraction aperture as the stage moves. Maintaining consistent spacing helps preserve extraction geometry and analytical consistency across the sample. IRIDIA Femto addresses this requirement with patented Dynamic Z technology that actively follows changes in sample height during analysis.	The system must include patented dynamic sample-surface tracking that automatically maintains a constant working distance between the sample surface and aerosol extraction aperture during analytical stage movement. The capability must compensate for sample tilt, topography, and changes in sample plane and must operate independently of a single, fixed pre-analysis focus position.
4. Modular COBALT Sample-Chamber Architecture	Fast mapping, depth profiling, conventional spot analysis, geochronology, and bulk quantification do not require the same aerosol-response characteristics. A modular chamber allows the laboratory to optimize aerosol extraction for the method without replacing the complete sample chamber.	The system must include a modular sample-chamber architecture with user-changeable aerosol extraction configurations. At minimum, it must support a fast-response configuration for high-speed imaging and depth profiling and a longer-response configuration for conventional spot, line, raster, isotopic, and bulk analytical workflows.

IRIDIA Femto Capability	Why the Capability Is Important	Suggested Minimum Requirement
5. High-Speed Mapping Capability to 4,000 Hz	Next-generation ICP-MS and fast-counting detector technologies can acquire data at increasingly rapid rates. The laser and sample-introduction system must not become the limiting component. Operation to 4 kHz supports faster mapping, reduced analysis time, higher pixel throughput, and emerging rapid depth-profiling methods.	The laser ablation system must support routine analytical operation at repetition rates up to 4,000 Hz and must be configurable with a rapid-response aerosol extraction module appropriate for high-speed elemental imaging and depth profiling. Repetition-rate changes must be software controlled without restarting or reinitializing the laser source.
6. Reversible Optical Configuration for Approximately 2 μm Spots	Research programs may require both ultra-high-spatial-resolution analysis and larger-spot work optimized for signal intensity and beam quality. A reversible configuration preserves broad application flexibility rather than permanently optimizing the instrument for only one regime.	The system must be configurable to achieve circular spot sizes approaching 2 μ m. The optical modification must be user-reversible so the original beam path can be restored to optimize beam quality and performance for larger spot-size applications.
7. Modular Sample Holder for 1 mm and 2 mm Slides	A flexible laboratory must accommodate microscope slides, thin sections, polished mounts, standards, and irregular samples without replacing the complete chamber. Support for both 1 mm and 2 mm slide thicknesses allows different prepared sample formats to be held securely at the intended analytical geometry.	The sample chamber must include a demountable, frame-based sample-holder system. The supplied configuration must accommodate standard slide or section formats of nominal 1 mm and 2 mm thickness and must be configurable for polished round mounts (1" or ½" rounds), reference materials, open trays, and irregularly shaped samples.
8. Upgrade Path to Energy Measurement at the Sample Plane	Energy measured only at the laser source does not evaluate losses or changes through the complete beam-delivery path. An energy measurement at the sample plane enables verification of delivered energy and supports future quality-control and preventative-maintenance workflows.	The system must be field-upgradable to include a software-integrated energy-measurement capability at or near the sample plane. The upgrade must permit verification of delivered laser energy without disassembly or realignment of the optical system and should support measurements before and after an analytical sequence.
9. Multiple ICP-MS Integration and Bidirectional Triggering	The intended laboratory workflow may involve more than one ICP-MS platform and may evolve as new detector capabilities become available. Manufacturer-supported interfaces protect the capital investment and enable synchronized spot, line, raster, mapping, and depth-profiling workflows.	The system must support manufacturer-supplied interface configurations for multiple ICP-MS platforms and must provide bidirectional electronic or software triggering through appropriate TTL, contact-closure, script, or plugin functionality. Required interface hardware and software for the identified ICP-MS instruments must be available with the proposed system.
10. Comprehensive Two-Year Warranty Including the Laser Source	The femtosecond light engine represents a significant portion of the instrument investment. Comprehensive coverage reduces financial and operational risk during the early years of ownership and avoids exclusions that leave the most costly component outside the system warranty.	The system must include a minimum two-year comprehensive warranty covering the complete laser ablation system. This includes all (non-consumable) parts and specifically includes the femtosecond laser source. All labor and required service travel are included in the terms of the warranty. Any exclusions must be stated clearly.

Supporting Documentation to Accompany This Matrix

- **IRIDIA Femto presentation:** Energy and stability with increasing repetition rate; side-by-side ablation and crater examples across spot sizes and matrices; sample-chamber and Dynamic Z illustrations.
- **IRIDIA Femto technical specifications:** 257 nm wavelength; pulse duration below 290 fs; 1–4,000 Hz repetition-rate range; 0.5% RSD stability at 1 kHz; spot-size range; modular sample holder; triggering and system configuration.
- **IRIDIA Femto pre-installation/site preparation guide:** System dimensions, laboratory footprint, utilities, safety, mobility, and installation requirements.

Document note: The suggested wording is intended to identify capabilities necessary for the laboratory's scientific and operational objectives. Final language should be reviewed and adapted by the institution in accordance with its procurement policies.

Elemental Scientific Lasers, LLC
ESL FEMTO

Elemental Scientific Lasers, LLC

685 Old Buffalo Trail
Bozeman, MT 59715

Quotation

Date	Quotation #
3/9/2026	3636

Name / Address
Unviersity of Florida (Central) Ryan Ogliore Physics Dept Physical Sciences Building 4111 Libra Dr Orlando, FL 32816

Terms	Incoterms	Expiration Date	Rep
Net 30	ExWorks	4/30/2026	

Item	Description	Qty	Rate	Total (US\$)
301852	MODEL, ESL FEMTO	1	350,000.00	350,000.00
301463	KIT, PLATFORM, TOWER	1	0.00	0.00
6000-5003	PWR CORD, 10A/110V, US, BLK 7 6"	1	0.00	0.00
216761	LASER,FEMTO,257NM	1	0.00	0.00
301853	KIT, OPTICS, SYSTEM, 257NM	1	0.00	0.00
215928	*ASSEMBLY, IVA, 50X*	1	0.00	0.00
301827	KIT, TV3, 213nm	1	35,000.00	35,000.00
300585	ASSEMBLY, DRAWER, 9 PUCK, TV3	1	1,200.00	1,200.00
301249	ASSEMBLY, DRAWER, GEO, TV3	1	1,200.00	1,200.00
301377	ASSEMBLY, AUTOCAL DRAWER, TV3, LOW ENERGY	1	7,500.00	7,500.00
301194	KIT, CONNECTIVITY, MASS SPEC, THERMO	1	750.00	750.00
DCI-TV3-73	Ultrafast DCI2 TwoVol3 Laser Ablation Interface for iCAP Q/RQ/TQ, NEOMAand TOFWerk ICPMS. Complete kit including torch and injector assemblies.	1	5,000.00	5,000.00
301500	Software, iolite V4, Educational Version	1	3,000.00	3,000.00
301884	INSTALLATION, TV3 WITH ONSITE APPS TRAINING	1	16,500.00	16,500.00
1200-1020	Standard 1-year warranty	1	0.00	0.00
	OPTION/ACCESSORIES: PN#302221 - 10 SCCM N2 MFC = \$5,500 PN#301973 - Glass Signal Smoother Assembly = \$950 PN#302470 - ECHO2, 2 Channel Signal Splitting Assembly for "split stream" analysis = \$10,000 PN#302560 - iolite Targeting, (annual subscription) = \$2,500			

Terms and Conditions as per Elemental Scientific Lasers LLC Standard Terms and Conditions of Sale

Total (USD)

Phone #	E-mail	Web Site
+1 406-586-3159	lasers@icpms.com	www.icpmslasers.com

Elemental Scientific Lasers, LLC

685 Old Buffalo Trail
Bozeman, MT 59715

Quotation

Date	Quotation #
3/9/2026	3636

Name / Address
Unviersity of Florida (Central) Ryan Ogliore Physics Dept Physical Sciences Building 4111 Libra Dr Orlando, FL 32816

Terms	Incoterms	Expiration Date	Rep
Net 30	ExWorks	4/30/2026	

Item	Description	Qty	Rate	Total (US\$)
	SHIP TO/END USER: University of Central Florida Ryan Ogliore Physics Dept Physical Sciences Building 4111 Libra Dr Orlando FL 32816			
	PACKING: Description: ESLfemto femto laser ablation system ECCN#: EAR99 # of Pcs.: 4 Weight (lbs.): Dimensions (inches): 1. Platform/Cart: 1040 lbs.: 54"W x 48"D x 70"H 2 Laser: 211 lbs.: 33"W x 25"D x 25"H 3. Chiller: 170 lbs.: 34"W x 24"D x 21"H			
Terms and Conditions as per Elemental Scientific Lasers LLC Standard Terms and Conditions of Sale			Total (USD)	\$420,150.00

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THE ULTIMATE LASER ABLATION INSTRUMENT

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- HIGHEST ACCURACY AND PRECISION
- ROBUST AND RELIABLE FEMTOSECOND LASER ABLATION
- APPLICATION FLEXIBILITY
- END-TO-END WORKFLOW



HIGHEST FREQUENCY LA IMAGING

- Laser frequencies in excess of 10 kHz!
- In combination with ESL's FAST aerosol transport technology, breakthrough the 1 kHz high speed imaging barrier!

HIGHEST ACCURACY AND PRECISION

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RELIABLE AND ROBUST FEMTOSECOND LASER ABLATION

- With a super reliable solid-state Pharos2 laser and a field proven optical design.
- A turn-key user experience with the lowest cost-of-ownership.
- Proven field-based performance.

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- Excels at both high precision bulk analysis and high-speed imaging.
- Compatible with all of ESL's application extending accessories including CryoCell, ECHO split streaming and even LIBS.
- 257nm femtosecond laser ablation as standard with other wavelength options available.

END-TO-END WORKFLOW

- When utilized with ESL's iolite software - A total analytical solution for geological bulk analysis, isotope systems and ultrafast elemental imaging.



Elemental Scientific
LASERS

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Tel: + 406 586 3159 | lasers@icpms.com | www.icpmslasers.com

Authors: Robert. W. Hutchinson¹, Katherine McLachlin², Ciaran O'Connor², Shane Hilliard², Leif Summerfield², Jay Wilkins², Erik Larsen²

Analytical Performance of a Turnkey Femtosecond Laser Ablation System

Introduction

Much has been made of the capability of femtosecond laser ablation ICPMS to reduce fractionation in analysis through extensive research to the point where a commercial market now exists for off-the-shelf femtosecond laser ablation systems such as the NWRfemto (now ESLfemto) from Elemental Scientific. Here we present research performed using Elemental Scientific's NWRfemto laser systems using peer reviewed work on matrix dependency of multistandard analysis from the Max Planck Institute (Mainz, Germany) and zircon analysis and particle distribution analysis from the University of Kyoto (Japan).

Improved precision in zircon analysis by femtosecond laser ablation

Geochronological analysis of zircons is a key application where improvement has been suggested through the implementation of femtosecond lasers since the low thermal component of the ablation process should reduce boiling of volatile Pb from the sample relative to U. The following data, supplied by the University of Kyoto and acquired using a NWRfemto, demonstrates zero fractionation due to heating, zero down-hole effect due to the smaller particle size distribution and excellent precision of multiple analyses in generating concordant data (Figure 1).

Pulse-width dependence of particle size distribution

Further studies from the Kyoto group have highlighted a phenomenon that has a great bearing on fractionation of analysis in common materials list NIST610. While, on average, the particle size distributions (PSD) generated by fs and ns ablations are broadly similar it was found that the PSD of ns ablations shifts throughout a down-hole ablation, such as is used in most geochronology experiments, while the PSD for fs ablations remains the same. Figure 2 highlights this data. An additional study on pure Ni metal demonstrated that, while the PSD's were the same for both fs and ns lasers the particle count for fs was around a factor of 20 higher (Figure 3).

1. ESI (New Wave Research division), 685 Old Buffalo Trail, Bozeman, Montana, 59715, USA

2. ESI (New Wave Research division), 8 Avro Court, Ermine Business Park, Huntingdon, PE29 6XS, UK

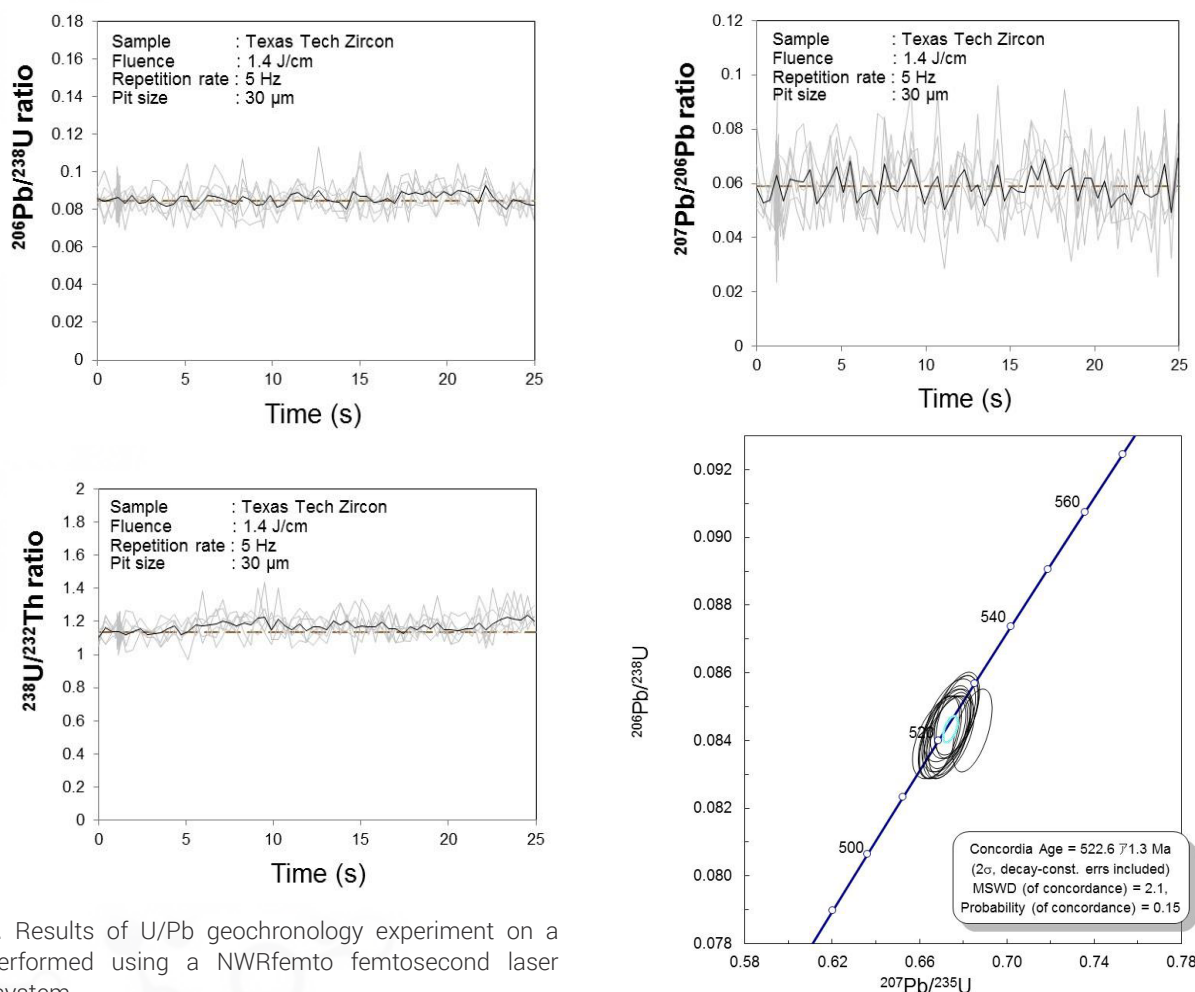


Figure 1. Results of U/Pb geochronology experiment on a zircon performed using a NWRfemto femtosecond laser ablation system.

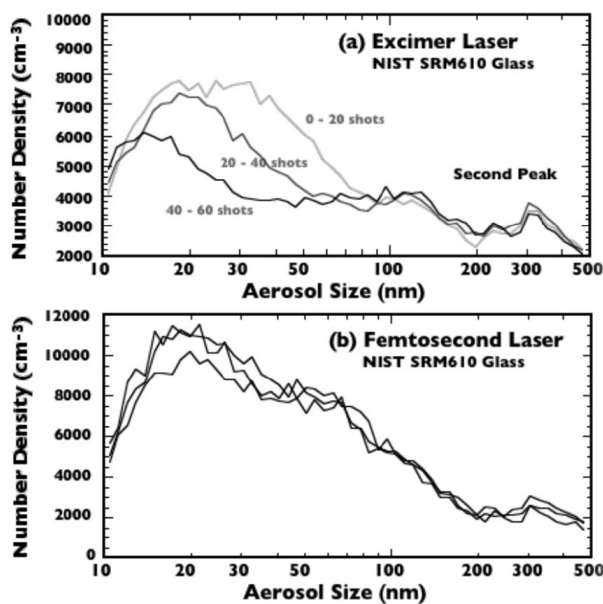


Figure 2. Time-dependent particle size distribution resulting from ns and fs ablation of NIST610. fs ablation shows no fractionation.

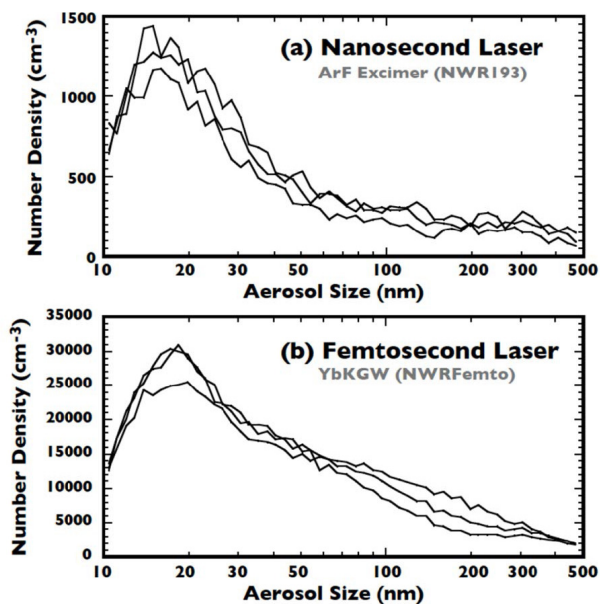


Figure 3. Particle size distribution resulting from ns and fs ablation of pure Ni metal. fs ablation gives 20x the particle count.

Reduced matrix-dependency with femtosecond laser ablation

The Max Planck Institute for Chemistry (Mainz, Germany) performed the most comprehensive assessment of matrix dependency of nanosecond and femtosecond laser ablation to date in a study using 22 certified reference materials ranging from silicates to carbonates to phosphates. The study involved direct comparisons of data from a NWR213 (now ESL213), a NWR193 (now ESL193) and a NWRfemto 200nm. A selection of the data from this study is presented as fractionation factors (Figure 4) and Element/Ca ratios (Figure 5). It can be seen that, especially for volatile/non-volatile ratios like Rb/Ca femtosecond offers a distinct improvement since the thermal component of the ablation is significantly reduced compared to nanosecond laser ablation. Figure 6 demonstrates matrix dependency of the ablation process by sample-type and element-type for each laser.

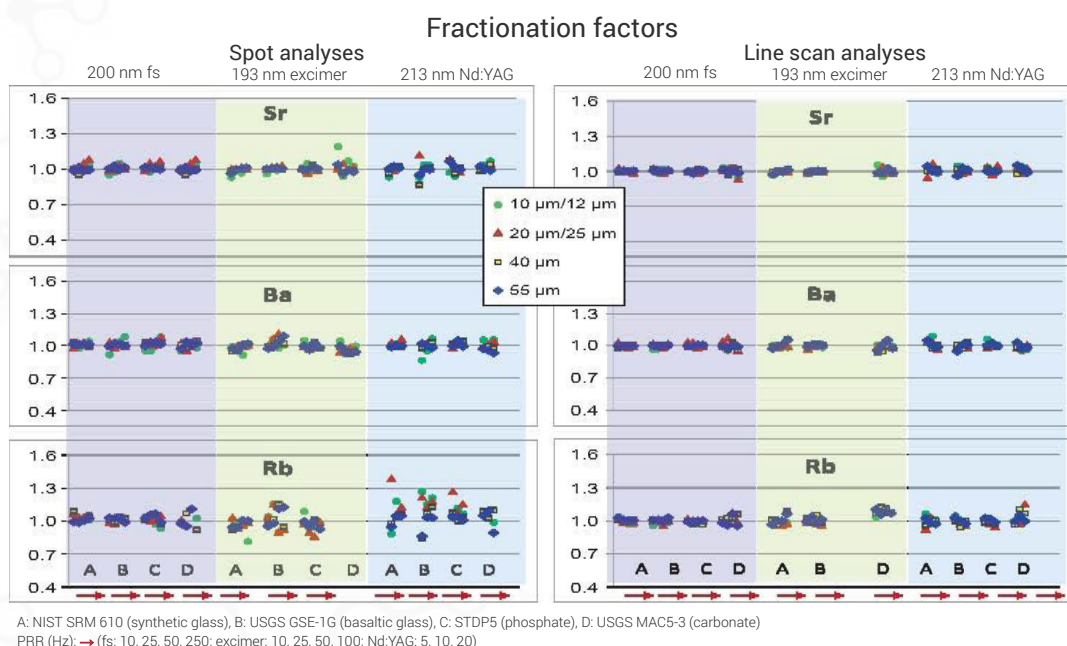


Figure 4. Time-dependent particle size distribution resulting from ns and fs ablation of NIST610. fs ablation shows no fractionation.

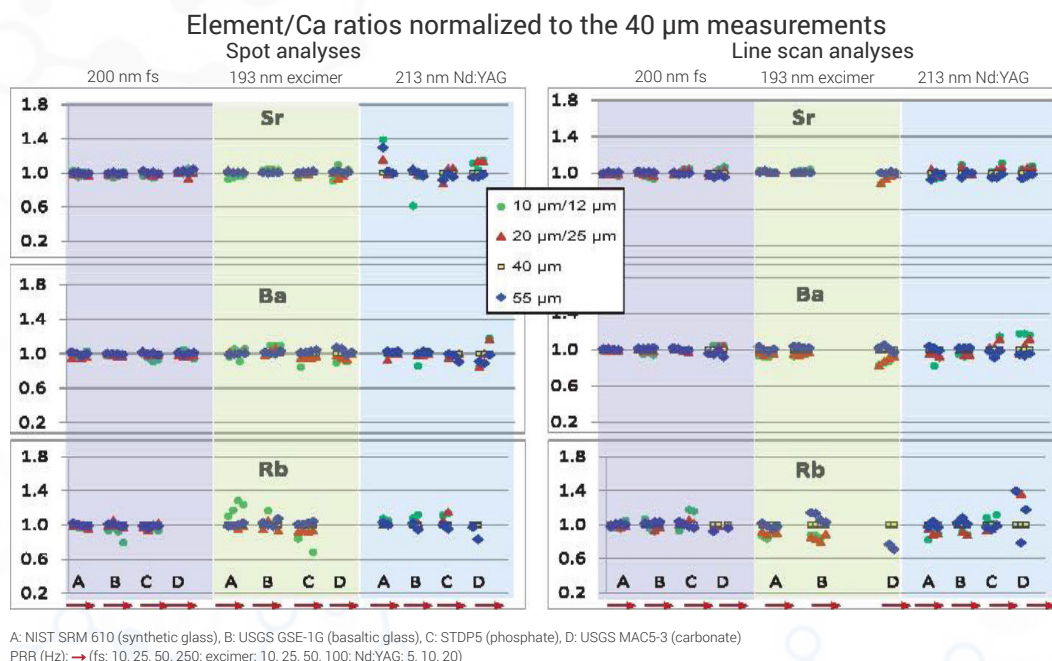


Figure 5. Element/Ca abundance ratios of seven elements obtained from investigation of four different reference materials with different matrices (NIST SRM 610, USGS GSE-1G, STDP5, USGS MACS-3) using 200 nm fs, 193 nm excimer and 213 nm Nd:YAG LA.

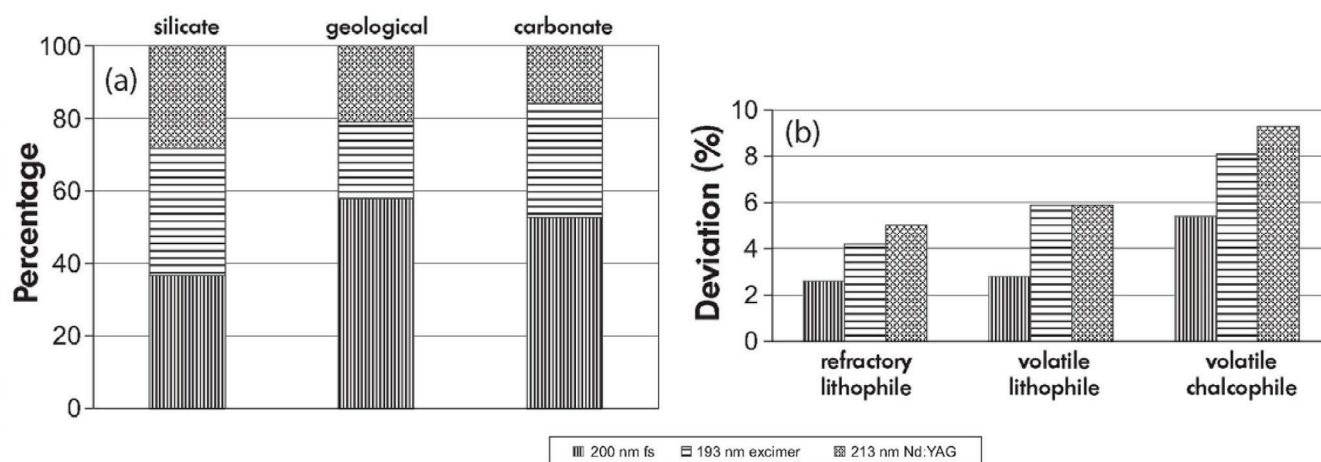


Figure 6. (a) Mean percentage of analytical data obtained by 200 nm fs, 193 nm excimer and 213 nm Nd:YAG LA, which agree best with the reference values. (b) Mean deviation of analytical data from reference values.

Conclusions

The NWRfemto is the smallest and most robust turnkey laser ablation system available today, and combining this with the proven benefits of ultra-fast UV lasers delivers a real and reliable return on investment.

Acknowledgements

Elemental Scientific gratefully acknowledges Prof. Takafumi Hirata and his group at the University of Kyoto (Kyoto, Japan), and Prof. Klaus-Peter Jochum and his team at the Max Planck Institute for Chemistry (Mainz, Germany) for supplying data for this poster.



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