



EUROPEAN UNION  
European Structural and Investing Funds  
Operational Programme Research,  
Development and Education



MINISTRY OF EDUCATION,  
YOUTH AND SPORTS

## Purchase Contract

entered into pursuant to Section 2079 et seq. of Act No. 89/2012 Coll., the Civil Code (hereinafter the “Civil Code”)

### I. CONTRACTUAL PARTIES:

#### 1. Buyer:

**Fyzikální ústav AV ČR, v. v. i.**

*(Institute of Physics of the Czech Academy of Sciences, a public research institution)*

with its registered office at Na Slovance 2

PSČ 182 21 Praha 8,

represented by: RNDr. Michael Prouza, Ph.D. - Director

Registered in the register of public research institutions of the Ministry of Education, Youth and Sports of the Czech Republic

Id. No.: 68378271

Tax Id. No.: CZ68378271

(hereinafter the “Buyer”)

and

#### 2. Seller:

**Menlo Systems GmbH**

with its registered office at Am Klopferspitz 19a

82152 Martinsried, Germany

Represented by: Dr. Michael Mei; Dr. Ronald Holzwarth – Managing directors

Registered in the trade register of Amtsgericht München

BIC: DEUTDEMMXXX

IBAN: DE74 7007 0010 0193 7424 00

Id.No.: HRB 138145

Tax Id. No.: DE 217772017

(Hereinafter the “Seller”; the Buyer and the Seller are hereinafter jointly referred to as the “Parties” and each of them individually as a “Party”).

enter, on the present day, month and year, into this Purchase Contract (hereinafter the “Contract”)

### II. INTRODUCTORY PROVISIONS:



1. The Buyer is the beneficiary of a subsidy from the Ministry of Education, Youth and Sports of the Czech Republic for the project “Advanced designing of functional materials: From mono – to I –And TRI- chromatic excitation with tailored laser pulses”, reg. No. CZ.02.1.01/0.0/0.0/15\_003/0000445, within the Operational Programme “Research, Development and Education (hereinafter the “**BIATRI Project**”).
2. The objective of the BIATRI Project is to create new research team in the field of the advanced designing of functional materials. This team will be managed by the excellent foreign researcher. To secure the quality of the scientific result it is important to build new laser laboratory. Special emphasis will be put on strategic partnership and cooperation with prestigious international partners. The implementation of the BIATRI project would in addition contribute to the increase of the competitiveness of the centre as well as of the region.
3. For successful implementation of the BIATRI Project, it is also necessary to purchase the Device (as defined below).
4. The Seller was selected as the winner of a public procurement procedure announced by the Buyer in accordance with the Act No. 134/2016 Coll., on Public Procurement, as amended (hereinafter the “**Act**”), for the public contract called “ Femtosecond fiber Lasers based on nonlinear optical loop mirror to induce passive modelocking” (hereinafter the “**Procurement Procedure**”).
5. The Seller acknowledges that the Buyer is not, in connection to the subject matter of this Contract, an entrepreneur, and also that the subject matter of this Contract is not related to any business activities of the Buyer.
6. The documentation necessary for the execution of the Contract is
  - a) *Technical Specifications, which forms an integral part hereof as its Annex 1 (hereinafter the “TS”); this TS also formed a part of the tender documentation for the Procurement Procedure in the form of Annex No.3,*
  - b) *The Seller’s bid submitted for the Procurement Procedure, (hereinafter the “Sellers’s Bid”); the Sellers’s Bid forms form Annex 2 to this Contract and an integral part hereof.*
7. The Seller represents that it has all the professional prerequisites required for the supply of the Device under the Contract, is authorised to perform the Contract and there are no obstacles on the part of the Seller that would prevent the Seller from fulfilling the Contract. The Seller is aware that the Buyer considers the participation of the Seller in the Procurement Procedure as a confirmation of the fact that the Seller is within the meaning of section 5(1) of the Civil Code capable of acting with due care and diligence that is connected with its profession and that, if the Seller does not act with the due care and diligence, it shall be to its disadvantage. The Seller shall not exploit its status as a professional nor its market position to the disadvantage of the Buyer and to achieve obvious and unreasonable imbalance in the mutual rights and duties of the Parties.



8. The Parties declare that accept the “risk of changed circumstances” within the meaning of Sec 1765(2) of the Civil Code.
9. The Parties declare that they shall maintain confidentiality with respect to all facts and information they learned in connection with the Contract or during the performance of the Contract, and the disclosure of such facts or information could cause damage to the other Party. This confidentiality provision does not affect duties of Parties with respect to applicable legislation.

### **III. SUBJECT OF THE CONTRACT:**

1. The subject matter of this Contract is the obligation of the Seller to deliver to the Buyer two femtosecond fiber lasers based on nonlinear optical loop mirror with qualities and technical parameters described in the TS (hereafter the “**Devices**”) in accordance with the terms and conditions of the Contract.
2. The following activities form an integral part of the performance to be provided by the Seller:
  - a) packing and transportation of the Devices to the place of performance, unpacking and checking in the extent specified in the TS,
  - b) preparation of and the handover of the instructions and manuals for users of the Devices,  
(The Devices and the activities required under para 2 above are hereinafter referred to as the “**Delivery**”).
3. The Buyer shall take over properly and timely delivered Devices and shall pay the Seller the Purchase Price under the terms and conditions of the Contract.
4. The Seller hereby undertakes, under the terms and conditions hereof, to deliver to the Buyer, properly and in timely manner the Devices, to hand over the Device to the Buyer and to carry out activities specified in paragraph 2 above. The Seller shall ensure the compliance of the Devices with the Seller’s Bid and with all valid legal, technical and quality standards in the extent specified in the TS, and the Seller shall ensure that the Devices shall have a properly issued and valid CE certificate, if applicable.
5. During the performance of the Contract, the Seller shall cooperate with the Buyer and shall follow the instructions of the Buyer unless such instructions contravene the Contract.

### **IV. OWNERSHIP TITLE:**

The ownership right passes to the Buyer upon the signature of the Handover protocol (as is defined below).

### **V. PURCHASE PRICE AND PAYMENT TERMS**



1. The Purchase Price for the Delivery is the maximum price that cannot be exceeded and is stated in Annex no. 3 – Price list without value added tax, (hereinafter the “**Purchase Price**”).
  2. Unless provided otherwise in this Contract, all the prices in this Contract are exclusive of value added tax, which shall be paid according to the applicable regulations or international agreements.
  3. The Purchase Price includes all the costs related with the performance of the Contract, including the cost of transport of the Devices to the place of delivery, the costs of Verification and Training, the costs of insurance including unloading until the Delivery, licenses, taxes and fees, etc. The Purchase Price is fixed and shall not be changed regardless of the changes of prices or changes in the foreign exchange rates.
  4. The Purchase Price shall be paid after the signature of the Handover protocol.
  5. The Buyer shall pay the Purchase Price on the basis of an invoice issued by the Seller.
  6. Invoices shall be payable within thirty (30) days of the date of their delivery to the Buyer. Payment of the invoiced amount means the date of its remitting to the Seller’s account. In conformity with the applicable tax regulations of the Czech Republic, the tax documents – invoices issued by the Seller hereunder shall include the following details:
    - the business name/designation and registered office of the Buyer
    - the tax identification number of the Buyer
    - the business name/designation and registered office of the Seller
    - the tax identification number of the Seller
    - the registration number of the tax document
    - the scope and object of the Delivery or Services
    - the date of issue of the tax document
    - the date of the supply or the date of acceptance of the consideration, whichever is earlier, if it differs from the date of issue of the tax document
    - the price
    - the registration number of the Contract, which the Buyer shall communicate to the Seller at his request before the invoice is issued
    - a declaration that the charged price is provided for the purposes of the " Advanced designing of functional materials: From mono – to I –And TRI- chromatic excitation with tailored laser pulses", reg. No. CZ.02.1.01/0.0/0.0/15\_003/0000445"
    -
- must also comply with any double taxation treaties applicable to the given case.
7. The last invoice in each calendar year must be delivered by the Seller to the Buyer’s no later than by December 15 of the given calendar year. If a tax document – invoice does not comply with the payment terms stipulated by the Contract or if it does not comply with the requirements stipulated by law or if it is not delivered to the Buyer by the aforementioned date, the Buyer is entitled to return the tax document – invoice to the Seller as incomplete, or incorrectly issued, for supplementation



or issue of a new invoice, as appropriate, within five (5) business days of the date of its delivery to the Buyer. In that case, the Buyer is not in delay in payment of the Purchase price or part thereof or the Price for Services and the Seller shall issue a corrected invoice with a new identical Maturity Period, which shall commence on the date of delivery of the corrected or newly issued tax document – invoice to the Buyer.

8. The Buyer's invoicing details are set out in Art. I hereof.

#### **VI. TIME OF PERFORMANCE OF THE CONTRACT:**

1. The Seller shall deliver the Devices to the place of delivery within 12 weeks from the signature of this Contract. It is possible to deliver each Device separately.
2. The Seller acknowledges that the deadlines stated in this article are of essential importance to the Buyer with respect to the timeline of the BIATRI Project and with respect to the deadline by which the BIATRI Project is to be implemented, and that the Buyer could incur damage as a result of failure to meet the above stipulated deadlines.

#### **VII. PLACE OF DELIVERY**

The place of delivery shall be Hilase centrum, Za Radnicí 828, Dolní Břežany in the Central Bohemian Region in the Czech Republic. At the request of the Seller made prior to the transport of each Device to the place of delivery the Buyer shall inform the Seller of the exact address.

#### **VIII. HANDOVER OF THE DEVICE**

1. Each Device shall be at the place of delivery handed over on the basis of handover protocol, which shall contain the following information:
  - identification of the Seller, the Buyer and all subcontractors, if there are any,
  - description of the Device including the list of individual items of the Device,
  - the list of defects and deficiencies of the Device, if there are any, and the deadlines for their removal,
  - the signature and the date of the handover

(hereinafter the "**Handover protocol**").

2. Instructions and manuals shall be attached to the Handover protocol.
3. The delivery of each Device marks the passage of the risk of damage to each Device from the Seller on the Buyer; however, this passage of risk of damage does not in any manner prejudice the Seller's liability for damage due to the defects of the Device.



4. The Buyer shall not be obliged to take over the Device with defects or deficiencies, regardless of the fact that such defects or deficiencies may not compromise the functionality and use of the Device. Should the Buyer not exercise its right not to accept the Device even when manifesting defects or deficiencies, the Parties shall list these in the Handover Protocol, including the manner and deadline for their removal. Should the Parties not specify a deadline for the removal of defects or deficiencies in the Handover protocol, then these must be removed within 14 days from the date of the handover.

### **IX. WARRANTY**

1. The Seller shall provide the warranty for each Device for a period of 12 months.
2. The warranty period shall commence on the date of the signature of the Handover Protocol. However, if the Device is taken over with defects or deficiencies, the warranty period shall commence on the date of the removal of the last defect or deficiency by the Seller.
3. If the Device which contains its own warranty documents then the warranty period shall be the period specified in such documents, unless does not exceed the warranty period stipulated in the Contract.
4. The Buyer shall raise a claim for removal of a defect of the Device without undue delay after discovering the defect, but not later than on the last day of the warranty period, by means of a written notice sent to the Seller's authorised representative for technical matters set out herein (hereinafter the „**Warranty Claim**“). An email is considered to be an adequate way to initiate a warranty claim. Warranty Claim sent by the Buyer on the last day of the warranty period shall be deemed to have been made in time.
5. In the Warranty Claim the Buyer shall describe the defect and the manner in which the defect is to be removed. The Buyer is entitled to:
  - request the removal of defects by substitute delivery, or
  - request that the defects are repaired, or
  - request an appropriate discount on the Purchase Price.

The choice among the above specified claims shall be made by the Buyer.

6. The Seller agrees to remove the defects of the Device free of charge.
7. Defects must be removed within the period of fourteen (14) days from the date, on which the Warranty Claim was notified to the Seller, at the latest, unless the Buyer and the Seller agree otherwise.



8. The Seller shall remove defects of the Device within periods stated in the Contract also in the instances when the Seller is of the opinion that he is not liable for such defects. In cases when the Seller will not recognize the defect and the Buyer will not agree with such conclusion, the validity of the Warranty Claim shall be ascertained by an expert, which is to be commissioned by the Buyer but on which the Supplier also must agree. In the event the expert declared the Warranty Claim as justified, the Seller shall bear the costs of the expert's assessment. If the Warranty Claim is raised unjustly (according to expert's assessment), the Buyers shall reimburse the Seller all reasonably incurred costs associated with removing the defect.
9. The Parties shall execute a record on removal of the defect, in which they shall confirm that the defect was removed. The warranty period shall extend by the time that expires from the date of exercising the Warranty Claim until the defect is removed.
10. In case the Seller fails to remove the defect within the time period set out in the Contract, or within other period as may be agreed by the Parties, or in case the Seller refuses to remedy the defect, the Buyer shall be entitled to have the defect removed at his own cost, and the Seller shall be obliged to compensate the Buyer for all reasonably incurred costs associated with removing the defect within 30 days of the Buyer's request to do so. Under the condition that the repair was professionally done, the scope and length of the warranty remains unaffected by this provision.
11. The warranty shall not cover defects caused by unprofessional handling, non-compliance with the manufacturers' rules of operation and maintenance of equipment accepted by the Buyer from the Seller upon handover, or those of which the Seller advised the Buyer in writing. The warranty shall also not apply to defects caused by intentional conduct.
12. Parties exclude application of the section 1925 (the sentence behind semi-colon) of the Civil Code.
13. The Seller shall provide to the Buyer technical support (consultation of operational, maintenance and other issues regarding the Device) free of charge on the phone no.: 0049-89-1891660 (e-mail: [service@menlosystems.com](mailto:service@menlosystems.com))

#### **X. CONTRACTUAL PENALTIES**

1. In the event the Seller is in delay with performance as stipulated by Art. VI para 1 of this Contract by more than 30 days, the Seller shall pay to the Buyer the contractual penalty in the amount of 0.05% of the Purchase Price for each, even commenced day of delay and for every individual case of delay.



2. In the case where the Seller fails to remove defects within the periods stipulated in the Contract, the Seller shall pay to the Buyer a contractual penalty in the amount of 500.00 CZK for each defect and for each day of delay.
3. If the Buyer fails to pay the Purchase Price or the Price for Services within the deadlines set out in this Contract, the Buyer shall pay the Seller interest on delay in the amount set forth by the law for each day of delay unless the Buyer proves that the delay with the payment of the Purchase Price was caused by late release of the funds by the provider of the support.
4. The obliged party must pay any contractual penalties to the entitled party not later than within 15 calendar days of the date of receipt of the relevant claim from the other party.
5. Payment of the contractual penalties pursuant to this article shall in no way prejudice the Buyer's right to claim compensation for damage incurred by the Buyer as a result of the Seller's breach of obligations to which the penalty applies.
6. Total amount of contractual penalties, which the Buyer is entitled to enforce pursuant to this Contract, shall not exceed 10 % of the Purchase Price.

#### **XI. TERMINATION OF THE CONTRACT**

1. This Contract may be terminated by completing the performance required hereunder, by agreement of the Parties or by withdrawal from the Contract on the grounds stipulated by law or in the Contract.
2. The Buyer is entitled to withdraw from the Contract without any penalty if any of the following events occur:
  - a) The provider of the subsidy or any other control body determines that the expenditures or part of the expenditures incurred on the basis of this Contract are ineligible; or
  - b) The financial subsidy for implementation of the BIATRI Project is withdrawn from the Buyer;
  - c) The Seller has materially breached the obligations imposed thereon by the Contract, specifically i) by being delayed with the performance hereunder by more than 3 months, or ii) Device fails to meet technical parameters and qualities or other requirements defined in the TS;
  - d) Insolvency proceedings are initiated against the Seller's assets,
  - e) should it become apparent that the Seller provided information or documents in the Seller's bid, which are not true and which could, therefore, influence the outcome of the Procurement Procedure leading to the conclusion of this Contract (Section 223(2)(b) of the Act No. 134/2016 Coll., on public procurement).
3. The Seller is entitled to withdraw from the Contract in the event of material breach of the Contract by the Buyer and in case of events outside the control of the Seller (e.g. natural disasters, etc.).





## **XII. REPRESENTATIVES OF THE PARTIES**

1. The Seller has appointed the following authorised representatives for communication with the Buyer in relation to the subject of performance hereunder:

In technical matters: Dr. Mose Choi, e-mail: m.choi@menlosystems.com

2. The Buyer has appointed the following authorised representatives for communication with the Seller in relation to the subject of performance hereunder:

In technical matters: Martin Smrž, Ph.D., e-mail: martin.smrz@hilase.cz

## **XIII. CHOICE OF LAW**

1. This Contract and all the legal relationships arising out of it shall be governed by the laws of the Czech Republic.
2. Any disputes arising out of this Contract or legal relationships connected with the Contract shall be resolved by the Parties amicably. In the event that a dispute cannot be resolved amicably within sixty (60) days, the dispute shall be resolved by the competent court in the Czech Republic based on application of any of the Parties.

## **XIV. FINAL PROVISIONS**

1. The Contract with all annexes represents the entire and complete agreement between the Buyer and the Seller.
2. The Parties agree that the Seller shall not be entitled to set off any part of its receivable, or receivable of its sub-debtor against the Buyer or any of his receivables, unless this Contract stipulates otherwise. The Seller shall not be entitled to assign any receivable arising in connection herewith to a third party. The Seller shall not be entitled to assign any rights or obligations arising to him hereunder or any of its parts to third parties.
3. The Seller shall:
  - duly archive all written material prepared in connection with the execution of this Contract and to provide access to the Buyer to these archived documents until 2027. The Buyer shall be entitled to take possession of these documents after ten years from the completion of the Contract from the Seller free of charge;
  - cooperate during financial inspections carried out in accordance with Act 320/2001 Coll.,



on Financial Inspections, as amended, i.e. to allow the Managing Authority of the Operational Program Research, Development and Education (hereinafter the “Sponsor”) to access also those portions of the bid submitted within the Procedure, the Contract, Orders and related documents which may be protected by special legal regulation, given that all requirements set forth by legal regulation with respect to the manner of executing such inspections will have been observed; the Seller shall bind any of its sub-contractors to comply with this obligation accordingly.

4. In the event that any of the provisions of this contract shall later be shown or determined to be invalid, putative, ineffective or unenforceable, then such invalidity, putativeness, ineffectiveness or unenforceability shall not cause invalidity, putativeness, ineffectiveness or unenforceability of the Contract as a whole. In such event the Parties undertake without undue delay to subsequently clarify any such provision using Sec 553(2) of the Civil Code, or to replace after mutual agreement such invalid, putative, ineffective or unenforceable provision of the Contract by a new provision, that in the extent permitted by the laws and regulations of the Czech Republic, relates as closely as possible to the intentions of the Parties to the Contract at the time of creation hereof.
5. This Contract becomes valid and effective as of the day of its execution by the authorised persons of both Parties.
6. The Parties agree to publish the full text of this Contract, including its annexes, in the Register of Contracts pursuant to Act No. 340/2015 Coll., on Special Conditions for the Effectiveness of Certain Contracts, the Disclosure of These Contracts and the Register of Contracts (Act on the Register of Contracts).
7. This Contract may be changed or supplemented solely in writing.
8. This Contract is drawn up in English language in four (4) counterparts, each of which is deemed to be the original. Each Party to the Contract shall receive two (2) counterparts.
9. The following Annexes form an integral part of the Contract:  
Annex No. 1: Requirements Specifications Document (RSD);  
Annex No. 2: The Seller’s Bid;  
Annex No. 3: The price list.

In case of any discrepancies between this Contract and its annexes, the provisions of this Contract shall prevail. In case of any discrepancies between Annex No. 1 and the other annexes of this Contract, the provisions of Annex No. 1 shall prevail.

10. The Parties, manifesting their consent with the entire the Contract, affix their signatures below.



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European Structural and Investing Funds  
Operational Programme Research,  
Development and Education



In  
Seller:

\_\_\_\_\_  
Name: Dr. Ida Z. Kozma  
Position: Head of Sales /  
Authorized signatory

In  
Buyer:

\_\_\_\_\_  
Name: RNDr. Michael Prouza, Ph.D.  
Position: Director



### Annex No. 1: Requirements Specifications Document (RSD)

Laser parameters	
Laser type	Femtosecond fiber Laser based on nonlinear optical loop mirror
Center wavelength	1030 ±1 nm
Minimum pulse energy	14 ±1 μJ (at 1 MHz)
Minimum average power	14 ±1 W (at 1 MHz)
Repetition rate	single pulse to 10 MHz
Pulse duration	chirped, 1000 ±50 ps, no compressor needed
Spectral bandwidth	>5 nm
Long-term power fluctuation	<1 % rms over 10 h
Beam quality	TEM00, M <sup>2</sup> <1.3
Polarization	linear
Mode-locking	passive mode-locking induced by nonlinear optical loop mirror with only polarization maintaining components, <b>no saturable absorber ML</b>
Warranty	12 months

Laser parameters	
Laser type	Femtosecond fiber Laser based on nonlinear optical loop mirror
Center wavelength	1030 ±1 nm
Maximum pulse energy	>4 nJ
Maximum average power	>200 mW
Repetition rate	50 MHz
Pulse duration	chirped
Spectral bandwidth	>9 nm
Long-term power fluctuation	<1 % rms over 10 h
Beam quality	TEM00, M <sup>2</sup> <1.1
Output	fiber-coupled, FC/APC
Polarization	linear, PM fiber
Mode-locking	passive mode-locking induced by nonlinear optical loop mirror with only polarization maintaining components, <b>no saturable absorber ML</b>
Warranty	12 months



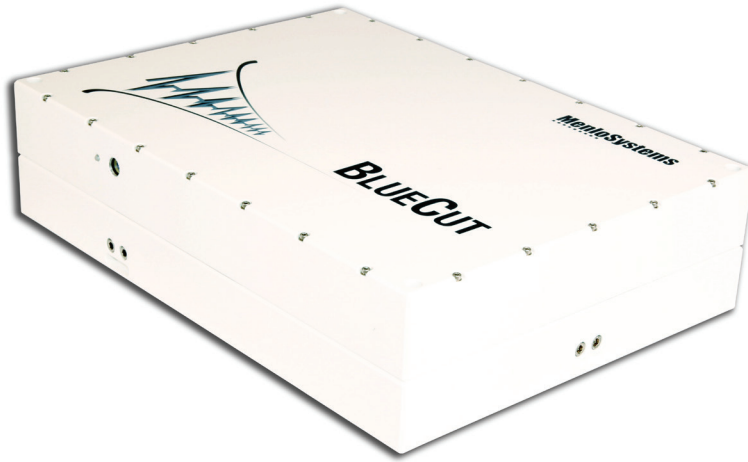
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Operational Programme Research,  
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## **Annex No. 2: The Seller's Bid**

# BlueCut

## High Energy Industrial Femtosecond Laser 1030 nm, 515 nm



The BlueCut is an industrial-grade micro-Joule femtosecond fiber laser system. Based on all-fiber integrated technology, this is an inherently robust and stable system, which comes in a sealed package designed for OEM integration. The system is maintenance free and easily field serviceable, ensuring maximum up-time demanded by both industrial and scientific applications. The high repetition rates available from the BlueCut combined with its high average power and superior beam quality allow for high throughput and increased efficiency for a fast return-on-invest.

## MenloSystems

### KEY SPECIFICATIONS

- Wavelength 1030 nm / 515 nm
- Pulse Energy: >10  $\mu$ J
- Average Power >10 W
- Pulse Duration: < 400 fs
- Burst Mode

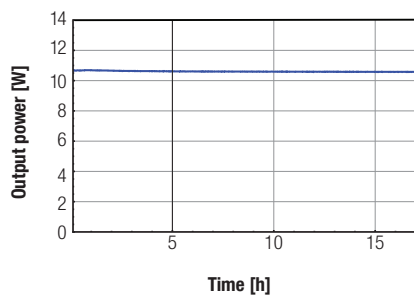
### APPLICATIONS

- Micro Material Processing
  - Waveguide Writing
  - Micro-Cutting
  - Micro-Structuring
  - Marking of Transparent Materials
- Biomedical
  - Life Science, Lab-on-a-Chip
  - Ophthalmology
  - Multi-Photon Microscopy
  - 2 Photon Polymerization
- Industries
  - Semiconductors
  - Organic Materials
  - Solar Cells
- Scientific
  - Seeding of Solid State Amplifiers
  - Nonlinear Frequency Conversion

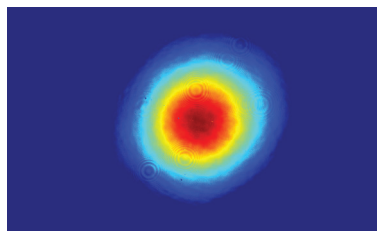
### PERFORMANCE DATA

#### Amplitude noise

< 1 % rms (over 12 h)

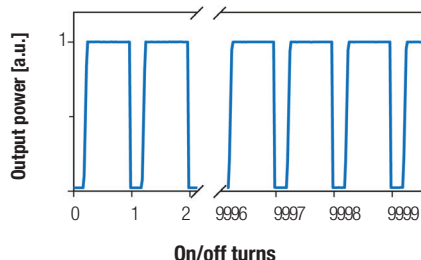


#### Spatial Mode

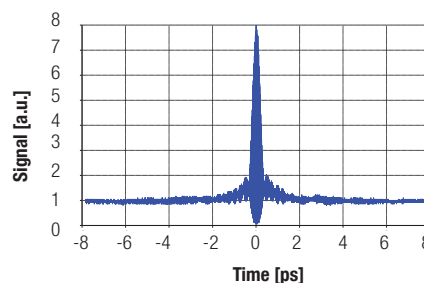


#### Reproducibility

Identical and consistent laser performance



#### Temporal Profile



### FEATURES

- Single Shot to 10 MHz
- Air Cooled
- All-Fiber Technology
- Compact Design for OEM Integration
- Robust and Stable
- Maintenance Free
- Remote Control

### OPTIONS

- SHG  
Frequency doubling to 515 nm
- Inquire about options for OEM integration

# BlueCut



## High Energy Industrial Femtosecond Laser 1030 nm, 515 nm

SPECIFICATIONS	BlueCut	BlueCut 515
Center Wavelength	1030 nm	515 nm**
Maximum Pulse Energy	>10 $\mu\text{J}^*$	>3.5 $\mu\text{J}^*$
Maximum Average Power	>10 W*	>3.5 W*
Pulse Duration	<400 fs	<400 fs
Spectral Bandwidth	>5 nm	>5 nm
Repetition Rate	single pulse to 10 MHz	
Long-term Power Stability	<1 % rms (over 12 h, for constant ambient temperature)	
Beam Quality	TEM00, $M^2 < 1.25$ , (typ. <1.20)	
Polarization	linear	
Output Control	integrated pulse picker for selection of repetition rate integrated fast shutter with analog-in and digital-in modulation for external gating integrated optical isolator	
Trigger Output Signal	pulse picker signal provided as RF trigger out	

\*Whatever applies first for a given repetition rate.

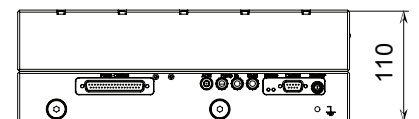
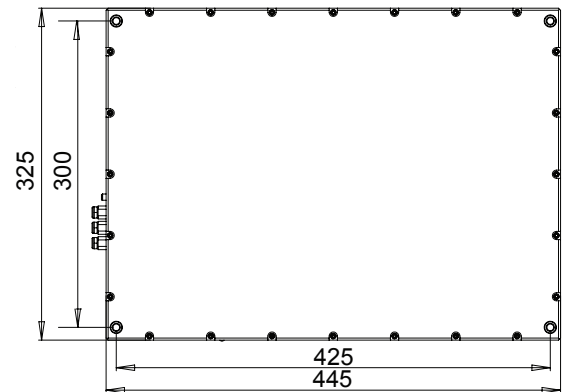
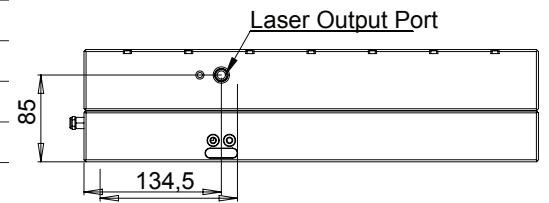
\*\*Secondary output @ 1030 nm, power ratio adjustable.

### UTILITY AND ENVIRONMENTAL REQUIREMENTS

Operating Voltage	100-240 VAC/50-60 Hz (optional 24 VDC, 20A)
Power Consumption	<500 W
Cooling Requirements	air cooling (no water cooling is required)
Warm-up Time	<30 min (<1 h for highest stability)
Communication interface	RS232 or USB, Laptop included with GUI
Range of Operating Temperature	15 to 35°C (60 to 95°F), non-condensing
Dimensions Head	BlueCut: 325 x 445 x 110 mm <sup>3</sup> BlueCut 515: 295 x 180 x 116 mm <sup>3</sup>
Dimensions Controller	19" x 4U x 495 mm
	Laser head and controller have a non-removable interconnection. (448 x 352 x 495 mm <sup>3</sup> )

### BlueCut

Example	Average Power	Pulse Energy
250 kHz	2.5 W	10 $\mu\text{J}$
1 MHz	10 W	10 $\mu\text{J}$
10 MHz	10 W	1 $\mu\text{J}$



Please contact us for technical drawings for BlueCut 515.

### ORDERING INFORMATION

Product Code	BlueCut	BlueCut 515
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.



Invisible laser radiation  
avoid exposure to beam  
Class 4 laser



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T+1 973 579 7227  
sales@thorlabs.com



# YLMO

## Femtosecond Fiber Seed Laser 1030 nm



## MenloSystems

### KEY SPECIFICATIONS

- Wavelength 1030 nm
- Output Power >200 mW
- Repetition Rate 50-100 MHz

### APPLICATIONS

- Amplifier Seeding for
  - High Harmonic Generation
  - Attosecond Science
  - Ultrafast Spectroscopy
  - Material Processing
  - Ophthalmology

### FEATURES

- High Stability
- Low Amplitude and Phase Noise
- All-PM Solution
- Single Mode-Lock State
- figure 9<sup>®</sup> Technology
- Laser Output in Less than 60 Seconds after Pressing On-Button

### OPTIONS

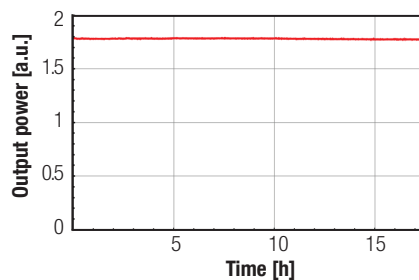
- **HIGH POWER**  
Including matched fiber amplifier YLMA to boost average output power up to 200 mW
- **VARIO**  
**User-Defined Repetition Rate**  
Factory-set value selectable in the 50-100 MHz range
- **MULTIBRANCH**  
**Additional Seed Ports**  
Seeding of multiple amplifiers

Menlo Systems' fiber-based femtosecond laser sources integrate the latest achievements in fiber technology into easy-to-use products. Menlo Systems' unique figure 9<sup>®</sup> mode locking technology results in reproducible and long-term stable operation. The YLMO with its PM-fiber design guarantees excellent stability and low-noise operation. As seed source for amplifiers the oscillator is maintenance free, user installed and ready to use at the press of a single button. In short: An OEM laser engineered for 24/7 operation.

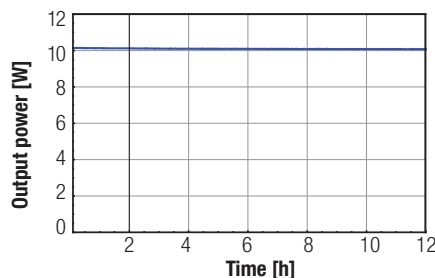
### PERFORMANCE DATA

#### Amplitude noise

YLMO Seed Laser  
< 0.5% rms (over >15h in ambient temperature)

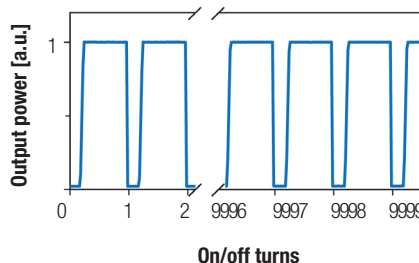


YLMO with Amplifier  
< 1% rms (over >12h in ambient temperature,  
YLMO seeding Menlo BlueCut)



#### Reproducibility

Identical and consistent laser performance





## Femtosecond Fiber Seed Laser 1030 nm

SPECIFICATIONS	YLMO	YLMO HIGH POWER
Center Wavelength	1030 nm $\pm$ 10 nm (other wavelengths on request)	1030 nm $\pm$ 10 nm (other wavelengths on request)
Average Power	>5 mW	>200 mW
Pulse Energy	>100 pJ	>4 nJ
Bandwidth	10 nm (other bandwidths on request)	
Pulse Width	chirped (bandwidth limited pulses with <150 fs on request)	
Repetition Rate	50 MHz (50-100 MHz with VARIO)*	
Output Port	fiber-coupled, SC/APC	
Polarization	linear, PM fiber	

\*Please inquire for your specific combinations of average power, pulse duration, repetition rate and external fiber length.

### REQUIREMENTS

Operating Voltage	5 VDC, 12 VDC/2 A**
Power Consumption	10 VA
Operating Temperature	15 °C - 35 °C
Laser Head Dimensions/Weight	265 x 110 x 58 mm <sup>3</sup> / 3 kg
Warm-Up Time	<60 s

\*\* Power supply for 100/115/230 VAC can be provided as option.

### TECHNICAL DRAWING



Please contact us for technical drawings for YLMO HIGH POWER.

### ORDERING INFORMATION

Product Code	YLMO	YLMO HIGH POWER
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Please call for pricing. Specifications are subject to change without notice. Custom modifications are available, please inquire.



Invisible laser radiation  
avoid exposure to beam  
Class 3B laser





EUROPEAN UNION  
European Structural and Investing Funds  
Operational Programme Research,  
Development and Education



### **Annex No. 3: The price list**

no.	Title	pieces	Price per piece (EUR excl. VAT)	Total price (EUR excl. VAT)
1	Yb-doped femtosecond fiber laser with 15 uJ/1 MHz pulses	1	81600	81,600.00
2	200 mW Yb-doped nonlinear mirror loop fiber oscillator	1	25500	25,500.00
	<b>Total</b>			<b>107,100.00</b>