CLPU – Centro de Láseres Pulsados
C/ Adaja, 8, Edificio M5, Parque Científico
37185 Villamayor (Salamanca) - ESPAÑA
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RESOLUTION OF THE DIRECTOR OF THE CONSORTIUM FOR THE DESIGN, CONSTRUCTION, EQUIPMENT AND EXPLOITATION OF THE SPANISH PULSED LASERS CENTER (CLPU), DATED JULY 31ST, 2020 IN WHICH THE REGULATORY BASES OF THE THIRD CALL FOR ACCESS TO THE VEGA LASER SYSTEM ARE APPROVED

1 Aim of the Call

The following terms aim to regulate the conditions for the competitive access of researchers from Spanish or foreign institutions, whether public or private, to the VEGA Laser System, to develop scientific experimental proposals and public or public-private collaborative projects, as well as the beam time allocation to the aforementioned.

To this end, the CLPU will consider as scientific experimental proposals those whose results may be published and disseminated, thus becoming part of scientific literature.

Similarly, the CLPU will consider as public or public-private collaborative projects those resulting from an agreement signed by the CLPU and other public or private institutions for the development of an experiment of common interest for both parties.

Those applications containing commercial or industrial proposals in which the participating researchers will use the results in a confidential manner, thus not willing to publish and disseminate the achieved results in scientific literature due to commercial purposes will be excluded from this call for access. In such cases, an appropriate contract will have to be signed with the CLPU.

The original intention of CLPU is to perform experiments with the physical presence of the user team. However, due to the present exceptional circumstances, and as long as it has been previously discussed and coordinated with the personnel of the CLPU, it could be also possible to develop experiments remotely, without the physical presence of any external scientist. In such case, a continuous online participation of the PI and of the rest of the team is expected.

2 Eligibility criteria

From a general standpoint, the requirements that should be matched by applicants are:

- Applicants (who shall be the Principal Investigators of the experiment) must be scientists having a PhD, preferably with experience in experimental campaigns, that develop their work in a technology institute, or in a scientific or academic institution, either national or international. The applicant is responsible for organizing and leading a scientific team in accordance with the complexity of the proposed experiment.
- Applicants that have already participated in previous CLPU competitive access calls (first and second) can't participate again in this third call unless they show peer reviewed publications of the previous results obtained at CLPU with proper acknowledgement to the CLPU collaboration.
- By submitting the application, the terms of the call are accepted by all the participants, who thus commit to submit all the required documents for a correct evaluation of the application.
- The applications must be submitted in English.

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3 Offered Access

The laser VEGA system is a CPA Ti:sapphire system, with a central wavelength of 800 nm +/- 10 nm. It has three arms with a maximum power 15 TW (VEGA-1), 150TW (VEGA-2) and 1 PW (VEGA-3).

The common front-end has a double CPA as well as an XPW system that increases the contrast of the pulses significantly, making it suitable for high density targets. The best reachable temporal contrast is: @ns (replica) $5 \cdot 10^{-10}$; @1 ps $2 \cdot 10^{-5}$, @5 ps $5 \cdot 10^{-8}$; @10 ps $8 \cdot 10^{-9}$, @100 ps $5 \cdot 10^{-12}$. More detailed technical details can be found in the CLPU web (www.clpu.es).

VEGA-2 and VEGA-3 are in operation with the functionalities described below, as well as some secondary sources from VEGA-2.

The three arms have pulse compressors working in vacuum (10^{-6} millibar).

VEGA-2:

Laser Beam:

- The VEGA-2 laser beam is offered linearly polarized (electric field with horizontal polarization) and in two different configurations depending on the parabolic mirrors used:
  - Long Focal configuration with F=130 cm (F/13) giving a final focal spot of around 20 microns (FWHM) positioned at 30 cm distance from the center of the chamber.
  - Short Focal configuration with F=40 cm (F/4) giving a final focal spot of around 6 microns (FWHM) positioned in the center of the chamber.
- The essential parameters of the VEGA-2 laser are: duration not shorter than 25 fs, and peak energy not larger than 5 J, at the exit of the pulse compressor.
- The mode of operation can be varied from single shot up to 10 Hz.
- We are also open to feasible VEGA-2 configuration proposals, such as pump-probe.

Experimental station:

- A cylindrical vacuum chamber of 120 cm in diameter that surrounds the focal point. The chamber is set so that the Long focal point remains 30 cm before the TCC (Target Chamber Centre) and short focal point remains in the TCC. Detailed information can be found in the CLPU web (www.clpu.es).
- Possibility of additional vacuum chambers, typically of 610 mm in diameter.
- Fixing and positioning systems for solid targets for experiments with high-density targets.
- Fixing and positioning systems for gas valves pulsed for low density targets.
- Any devices provided by the user have to be previously tested and approved by CLPU team.

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VEGA-3:

Laser Beam:

- The VEGA-3 laser beam is offered linearly polarized (electric field with horizontal polarization) in long focal configuration with F=250 cm (F/10) giving a final focal spot at of around 14 microns (FWHM).
- The essential parameters of the VEGA-3 laser are: pulse duration at full power not shorter than 27 fs, and peak energy not larger than 27 J, at the exit of the pulse compressor.
- The mode of operation varies from single shot up to one Hz.
- The focal spot is out of the focalization chamber in a separate one that can be setup according to the user needs.

Experimental station:

- A dedicated squared vacuum chamber about 150 x 120 cm (height 60 cm) will be provided with a dedicated optical table inside. Other smaller chambers are also available
- Fixing and positioning systems for solid targets for experiments with high-density targets.
- Fixing and positioning systems for gas valves pulsed for low density targets.
- Any devices provided by the user have to be previously tested and approved by CLPU team.

SECONDARY SOURCES FROM VEGA-2:

The long-term aim of the center is to offer secondary sources, i.e. sources obtained from the VEGA laser interaction with convenient targets. This is under development, but at this time we can offer, always in commissioning mode (all those sources use the VEGA laser beams, so users of the sources will have a limited use –if any- of the VEGA laser sources) the following:

- A source of Laser Wakefield Accelerated (LWFA) electrons, with energies of few hundreds MeV
- A source of betatron x-ray radiation of several KeV coupled eventually with a KB focusing system.
- A source of VEGA-driven Target Normal Sheath Accelerated (TNSA) protons with broad spectrum in the range from 1 to 10 MeV

Those sources represent an extraordinary opportunity for scientists interested in measuring and applying pulsed radiation (pulsed X-rays, pulsed particle beams, etc.) in the femtosecond regime.

INFORMATION ABOUT ADDITIONAL ITEMS

Information on the expected necessity of these additional items has to be included in the application with as much detail as possible.

Targets:

It is highly recommended that the users contact CLPU staff for the correct implementation of targetry devices, as this is a continuously developing area and new target possibilities may be available. At this moment, the center can provide:

- A three axis motorized moderate repetition rate (~ 0.01 Hz) system with a target holder hosting up to 256 possible shots.
- Several sorts of more or less conventional gas targets with the possibility to produce in situ different mixtures of gases.
- Users can also bring their own specific targets. In that case CLPU will provide the technical information and the user will be responsible for the adaptation of the target system in the experimental chamber.

Diagnostic systems:

- The center has basic detection equipment for transport, energy selection, focusing and detection of radiation and particle beams. A detailed list of available equipment will appear in the application form, they include a streak camera, optical spectrometers, CMOS cameras, XUV cameras, image intensifiers, wavefront diagnostics, pulse duration and characterization equipment, pulse contrast measurement, time of flight measurement, etc.
- CLPU team will try to facilitate the adaptation of the detection equipment that users may bring in addition.
- In addition, the center has characterization equipment in the laser area: temporal (wizzler, sequoia), wavefront (Phasics), autocorrelator, energy meters, spectrometer, spatial profile analysis chamber, oscilloscopes, photodiodes.

Vacuum:

- Due to the requirements of the CPA compressors, VEGA operation requires a high vacuum level (10^{-6} mbar) and with very strict cleanliness requirements, so as to avoid chemical contamination (especially from hydrocarbons). Any equipment that the users may install must comply with these requirements. The CLPU will provide the necessary vacuum elements and will perform a validation of any given elements that may pose a problem.

Other services:

Upon request made well in advance, the center may offer the following services associated with the access:

- Mechanical workshop where elements required for each experimental campaign may be made. This service will take care of the adaptation of the experimental items to the CLPU equipment (adaptors, flanges, feedthroughs, …) provided that the user gives detailed information (complete CAD models) at least three months in advance of the experiment.
- SEM microscope, and a conventional optical microscope.

- Other lasers with lower peak power (Nd:YAG Q-Switched 1 J / 10 ns pulses at 1 Hz and 1064 and 532 nm; Ti:sapphire CPA 3 mJ / 100 fs pulses at 800 nm and 1 kHz) in a separate laboratory (not for pump-probe experiments with VEGA).

Human resources:

- The center has a highly-specialized scientific and technical staff. Users will exclusively work in the target area or its control area, never in the laser room. The laser will only be operated by the CLPU specialized laser staff. The parameters of the laser will be previously discussed with the laser personnel.
- A wide array of users is considered, ranging from those highly specialized (credited as Target Area Operator) that will work under the supervision of a scientist of the center, to collaborators that will need a scientific support team.
- The center will also provide information and logistical support to the users. The travel and living expenses must be borne by the users.
- The personnel of the center will be responsible for the safety training of the users, issuing the appropriate permissions to each depending on their previous training as well as that received at CLPU
- During the experiment, the link between users and the center and its personnel will be the CLPU scientist designed as experiment Supervisor of each specific experiment. The rest of CLPU personnel shall under no circumstance receive requests or instructions directly from users.

4 Safety

The target area is a bunker that belongs to the IRA 3254 (Radioactive Authorized Facility) authorized by the Spanish Nuclear Safety Council (CSN) and has to comply with its regulations. The center has the control elements necessary so as to guarantee its safety in this respect. The authorization covers experiments involving high-energy photons, electrons, protons and other heavier ions. Experiments involving a relevant number of neutrons or unstable isotopes could induce an additional risk that has to be evaluated specifically.

When appropriate (e.g. if the experiment requires an operation in the target area while the area is declared as restricted access area) external users shall bring their own personal passive dosimeter, according to CLPU radiological safety regulations.

Laser safety and personal protection equipment (such as laser protection goggles) will be provided when necessary.

The center will provide users with training related to safety, and may request proof of their previous laser safety experience when deemed necessary.

5 Funding

The scientific proposals allocated for this call of competitive access experiments shall be co-financed between CLPU and users. That means that users shall cover at least 20 percent of the cost of VEGA-3

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access fee and at least 50 percent of the VEGA-2 access fee corresponding to the Group 1 fees (fees are published at our web page https://www.clpu.es/en/facilties-vega-fee-policy).

Users can co-fund such access fees directly, through their institutions, or through national or transnational access programs, such as Laserlab-Europe (network of infrastructures in which CLPU takes part).

In order to be eligible for funding through the Laserlab-Europe network, applications need to fulfil the following criteria of eligibility: https://www.laserlab-europe.eu/transnational-access/how-to-apply-for-access/criteria-of-eligibility-for-transnational-access. For those applicants who will benefit from Laserlab-Europe-funded access, the access will be free of charge and their travel and living expenses will be covered as well.

Users who want to apply for funding through Laserlab-Europe will indicate this circumstance in the application and shall allow CLPU to transfer of the information related to the proposal to Laserlab-Europe and comply with their follow-up requirements, including the remote access conditions.

Alternatively, instead of the mentioned co-financing, contributions in-kind could be accepted. In this case, users must clearly describe, justify and value these contributions in the application and this has to be approved by the CLPU Director.

The access in the terms previously indicated includes the time of use of the VEGA laser system beam, the use of the existing scientific and technological equipment and the support human resources for science, technology and logistics.

CLPU shall not be obliged to provide complex adaptations, additional consumables or spares and equipment not available at CLPU. However, in some cases, with prior negotiation and under payment, CLPU could provide them.

6 Deadline for the submission of the proposal

The term for the submission of the proposals will start on the **publication date** and will be open until **October 31st, 2020**. However, the call will remain open until the beam quota is met.

The **Local Coordinator** that acts as liaison between applicants and the center for this campaign is **Prof Luca Volpe (vegaservice@clpu.es)**. It is advisable to contact the Local Coordinator before submitting the proposal so as to check the feasibility of the development of the proposal in the CLPU and for the user to receive orientation about the submission, if necessary. These types of experiments are very complex and have very varied characteristics, so such a discussion prior to submission of a proposal is very important to optimizing the feasibility of the proposals.

7 Access cycle

The experimental proposals received during this call will be executed in the access cycle[1] that ranges **from January 2021 to July 2022**, tentatively.

In this call a tentative number of 50 experimental shifts is offered. A fraction of 20 percent maximum of these shifts are reserved to young researchers[2].

[1] *Access Cycle: period of access covered by each call*

The distribution in terms of one arm or the other of VEGA is in the hands of the Access Committee to scientifically optimize the use of these resources. It is expected that the experiments of VEGA-2 and VEGA-3 will last several weeks (a typical experimental address is between 2 and 3 weeks), while the secondary sources experiments can be substantially shorter.

The week before to the commencement of the experimental campaign, users will be able to access the target area for the preparation of the campaign.

Users will be able to access to the facilities between 8:00 AM and 8:00 PM on weekdays (Monday to Friday). Saturdays, Sundays and Public Holidays the center is closed. Each shift corresponds to at least five laser hours at high power, between 11:00 AM and 5:30 PM as a general rule (this can be modified due to unexpected technical reasons).

8 How to submit the proposal and documents to be furnished[3]

The applicants as well as any researcher that may participate in the experiment will have to **sign up in the Facility Access Request On-line (FARO) system** that may be accessed by users in the website of the CLPU (https://www.clpu.es/facilities/servicerequest/). The researcher in charge or submitting the proposal will have to complete the **access request form** that is found in the FARO application.

It is possible to submit more than one proposal to this call. Additionally, the following documents will be submitted:

- Accreditation of experience of the participants.
- Any other requested documentation for the correct evaluation of the proposal.

9 Evaluation boards and access criteria

All proposals will be firstly reviewed by the **Internal Committee** (formed by scientific and technical personnel of the CLPU). The Internal Committee will check if the development of the experimental proposal is feasible in the center, taking into account the following criteria:

- Technical feasibility
- Resource availability
- Safety and radiological protection aspects associated to the experiment

Then, the **Access Committee** will evaluate the scientific and technical quality of the experiment and will organize the distribution of beam time and the order of the experiments so that the resources of the center are optimized. This board is formed by a minimum of five members, where two are staff or adjoin to the CLPU (scientific and technical personnel) and at least three are external members (highly recognized experts) in order to ensure the impartiality of the assignment of beam time.

[2] *Young researcher: Those who have obtained their PhD diploma within seven years before the application. These proposals must have been rated as of high scientific interest.*

[3] *All the information submitted by the applicants will be firstly reviewed by the Local Coordinator, who will check that the information submitted by the users is complete and is sufficient for both the Internal Committee as well as the Access Committee to perform their respective evaluations.*

The criteria for selection followed by the Access Committee and their percentage on the final score are the following:

GENERAL EVALUATION CRITERIA	
Quality and originality of the project & research plan	**45 %**
Scientific-technical relevance in comparison to other applications received	
Innovative & relevant objectives in comparison to the state-of-the-art knowledge	
Planning, experimental arrangements & working plan adequate to the project objectives	
Researchers & collaborators scientific or academic excellence	**20 %**
PI & research team capacity to carry out the programmed activities	
Previous results & recent contributions of the research team to the project field	
Potential Impact	**10 %**
Contribution to the scientific community	
Social, economic or industrial importance of expected results	
Chances of exploitation of results (intellectual property, patents)	
Talent Promotion	**10 %**
Young researchers involvement	
First access to the CLPU of team researchers	
SPECIFIC EVALUATION CRITERIA	**15 %**
Criterion 1 Transfer of knowledge to the CLPU	5%
Criterion 2 Outstanding publications from previous CLPU campaigns	5 %
Criterion 3 Exploitation of VEGA unique features	5 %

If during the evaluation of the proposals by the Access Committee any question that cannot be settled by this committee due to its scientific level arises, the question will be transferred to the Scientific and Technical Advisory Committee of the CLPU.

The Access Committee will assign a tentative order of precedence to the proposals, recommending a number of experimental shifts. Among the proposals rated as of high scientific interest, the ones that justify funding will be given priority.

The Access Committee will propose to the Director a reasoned and prioritized ranking of applications, based on their scientific and technical quality. The Director will decide the final list of authorized accesses.

10 Notification of Evaluation Results

Applicants will receive via email the final result of the evaluation of their experimental proposal, including its ranking and the number of experimental shifts awarded, if any. Applicants whose proposals are approved will have to confirm their acceptance within 15 days after the notification is sent.

If the confirmation by the applicant does not meet the deadline, the experimental shifts will be assigned to a different proposal from the waiting list.

The Resolution (notification of results) by the Director of the CLPU, shall be issued within a maximum period of six months from the submission of the online applications, and will divide the scientific proposals in the following categories:

- A (Approved)
- B (Waiting List)
- C (Not approved)
- D (Nonviable)

All proposals rated in A and B categories are of high scientific interest. The sum of all recommended shifts in the A (Approved) applications must be equal or less than the number of offered experimental shifts. The final decision with the lists (approved, waiting list, not approved and nonviable applications) and their ranking will be published in the website of the CLPU, maintaining the confidentiality of the applicants and sensitive information. As for the applications ranked as B, since they are also considered of high scientific interest, the center will study the reasons why they were not approved and may make recommendations to the applicant so that the proposal may be submitted again in the next call for access.

An appeal for reconsideration against the resolution to the Director of the CLPU may be lodged within a month from the issuance of the Resolution. Also, a contentious administrative appeal may be lodged against the resolution before the contentious administrative court of Salamanca, within 2 months of the issuance of the Resolution. If an appeal for reconsideration against the resolution is lodged, it will not be possible to lodge a contentious administrative appeal until the appeal for reconsideration is resolved, or dismissed.

11 Planning of the experimental campaign.

The users who have been allocated with beam time must plan and prepare the experiment enough in advance (typically three months) prior to the commencement of the experimental campaign. The center will name an experiment Supervisor, who will be in contact with the applicant. All the preparation details have to be discussed with the experiment Supervisor who will convey the information, requests, etc. to the proper CLPU staff who will be in charge of those aspects.

The allocated time is based on the project submitted and rated by the Access Committee, so substantial changes are not allowed. In case of scientific changes that represent a major modification of the safety requirements (radioprotection, chemical, or other risks) indicated in the application, the center has the right to cancel the campaign and reuse the laser time in the best way.

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12 Documentation and Training before accessing the CLPU.

Before the beginning of the experimental campaign, those team members that will participate in the experiments, will have to provide the following documentation:

- Authorizations of their home institutions for all the participants in the experiment.
- Proof of insurance through liability and accident insurance during the stay in the CLPU.
- Medical fitness certificate issued in the last twelve months indicating fitness to participate in the experiments on a form provided by CLPU.
- Also, they must complete and pass the safety training required by the CLPU.

13 Acceptance of the conditions by the admitted researchers.

All the researchers that will participate in the approved experimental campaigns are required to agree to the following commitments to:

- Sign the “Access Terms & Conditions” document.
- Fill in the quality of service questionnaire at the end of the service.
- Submit a report about the experiment developed once it has finished, within an agreed deadline. In the report, the number assigned to the proposal will appear.
- Acknowledge the participation of the CLPU in the results, co-authorship or use of the facilities of the CLPU, as the case may be.
- Communicate the publications derived by the works developed in the CLPU.
- Authorize the CLPU to publish the subject of their research. You could be asked for additional information (e.g. images, graphics, presentations, etc.) so as to disseminate the results of the experiment (e.g. annual report, newsletter, web, etc.).
- In the cases of projects funded by external institutions that require the completion of a signed satisfaction form, which confirms that the experiments have been developed in the facilities of the CLPU, submit a copy to the Center.

Taking into account that the researchers & collaborators scientific or academic excellence is an evaluation criterion, the attendance of the Principal Investigator and/or collaborators whose inclusion in the proposal was scored is mandatory. The center reserves the right to cancel an experiment in the absence of the aforementioned researchers.

Failing to comply with the required commitments may compromise the possibility of presenting new scientific proposals for access to the different services offered by the CLPU for a period of two years.

Salamanca, July 31st, 2020

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Nombre de reconocimiento (DN): 2.5.4.13=Contrato privado: Fecha contrato: 01-03-2018/Fecha autorización: 01-03-2018, cn=37268360B LUIS ROSO (R: S3700007B), givenName=LUIS, sn=ROSO FRANCO, serialNumber=IDCES-37268360B, title=DIRECTOR, 2.5.4.97=VATES-S3700007B, ou=DIRECCIÓN, o=CONSORCIO PARA EL.. CENTRO DE LÁSERES PULSADOS, c=ES
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Luis Roso
Director