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| Proposal Template InstructionsThis is the official template which must be used for proposals submitted for consideration by LaserNetUS. **Proposals are limited to 6 pages in PDF format**, not including four appendixes: (I) References; (II) Tentative Research Team; (III) Technical Parameter Table; and a (IV) Target Support Request.**The grey boxes throughout the document provide section specific character limits (including spaces), instructions, and writing prompts. They should be deleted before submission.**The content should be written in Times New Roman 11pt font, single-spaced, and aligned in mode “justify”. Please make sure to set the following normal margins: top, bottom, right: 1.0” (2.5 cm); left: 1.0” (2.5 cm). Figure captions can be Times New Roman 9pt font.Use the following main sections, appearing in bold, and include additional numbered subsections as needed to enhance the readability of the proposal.If this proposal is the continuation of a previously awarded experiment on any of the LaserNetUS facilities, a **one-page** progress report should be uploaded separately in the proposal submission system. It should include: the proposal number(s), dates of experiment(s), facilities/instrument(s) used, and a brief summary of the experiment and how results have been disseminated (list major invited talks, papers published or in press, awards or special recognition)If you have any questions on the use of this template, please contact Chandra Breanne Curry or Arianna Gleason. |

LaserNetUS Proposal for Cycle 6

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| Cycle 6 Experiment Dates: July 2024\* – July 2025\*Earliest start date will depend on facility readiness and proposal feasibility**Proposal Deadline: Tuesday, December 12, 2023 4PM PT** |

 **Title of Proposed Experiment:**

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| Provide a descriptive title of your proposed experiment that will be made public if awarded experiment time.  |

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| **Spokesperson:**First Name Last NameDivision/DepartmentInstitutionJob Title/RoleMailing Address Line 1Mailing Address Line 2E: abc@xyz.eduT: +1 (xxx) xxx-xxxx*​​* |  |
| **Lead Principal Investigator (PI):**First Name Last NameDivision/DepartmentInstitutionJob Title/RoleMailing Address Line 1Mailing Address Line 2E: abc@xyz.eduT: +1 (xxx) xxx-xxxx*​​* | **Co-PI(s):**First Name Last NameDivision/DepartmentInstitutionJob Title/RoleMailing Address Line 1Mailing Address Line 2E: abc@xyz.eduT: +1 (xxx) xxx-xxxx*​​* |

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| The ‘Spokesperson’ is the primary administrative contact for the proposed experiment. The ‘Lead PI’ typically conceives of the idea, designs the experiment, and leads the experimental team and analysis effort. **In almost all cases, the Spokesperson and Lead PI are the same.** A "Co-Principal Investigator" (Co-PI) is a mandatory requirement for all submissions when a student or postdoctoral researcher assumes the role of Principal Investigator (PI). In such scenarios, the Co-PI typically serves as their supervisor or manager, taking on the responsibility of training, oversight, securing funding, and providing the necessary resources to facilitate the experiment. Moreover, the Co-PI serves as the primary point of contact in the event the student or postdoc PI leaves the project.We firmly believe that it is best practice for student and postdoc PIs to be mentored by a more experienced team member who is consistently present at the facility throughout the experiment. In situations where this may not be feasible, the student or postdoc PI should conduct daily meetings with their supervisor or Co-PI to coordinate activities and relay progress updates. It is highly recommended that the Co-PI is actively involved in all communications and, ideally, participates in all planning meetings with the facility.A list of all participants that you expect to be involved in the proposed research is required. It should include students, designers/modelers, target fabrication technicians, etc. This information is collected in appendix II: Tentative Research Team. This information is critical to assess if the team/collaboration has adequate experience and staffing levels are compatible with the support provided by the facility. |

# Abstract

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| **Abstract Character Limit: 1,900**Provide an abstract that concisely summarizes the proposed experiment. Emphasize the hypothesis to be tested, expected scientific results and impact. Indicate the observables to be measured (or the relevant experimental approach), samples to be studied etc. State the primary LaserNetUS facility. |

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**Introduction**

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| **Introduction Character Limit: 2,000**This should briefly introduce the topic including essential background, context, and references for a general, **non-expert** audience.References should be numbered in the order in which they appear in the proposal in the following format [1], [4-7], [2, 3, 12-14].Consider the following questions to guide your writing:* What is the topical area?
* What is the scientific importance of this topic and potential societal impact?
* What is the current state of knowledge, and where are the significant knowledge gaps or outstanding questions (and why)?
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**Scientific or Technical Case**

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| **Scientific or Technical Case Character Limit: 5,000**Recommended: 1 figureFocus on the scientific (or technical) objectives of the proposed experiments. This section should be highly detailed however it is important that it is thoroughly referenced such that reviewers from a related research area have adequate information to assess this work in the context of the topical area.Use the following questions to guide your writing:* What is the hypothesis to be tested, or what essential question is to be addressed in these experiments?
* What are the experimental observables, and how will these observables address the main scientific (or technical) objectives of the proposal? Modeling and/or prior results that can quantify the expected observables should be presented wherever possible – see “feasibility” section below.
* Describe how the experiment has been designed using theory, simulations, or previous work.
* What measurements are required for the proposed experiment to be considered a success? If successful, what will be the impact on your topical area?

Provide a roadmap for the analysis and interpretation of the experimental measurements to answer the hypothesis/essential questions of this experiment. **Consider including a description of the role of theory, simulations, or analysis methods post-experiment.** |

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Figure 1: Descriptive caption. Times New Roman, 9pt font, centered on figure.

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**Experimental Details**

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| **Experimental Details Character Limit: 2,000**Recommended: 1 figureProposals must contain sufficient information for LaserNetUS facility scientists to review the proposal for technical feasibility and/or suitability at the primary and secondary LaserNetUS facility. We strongly recommend that you contact the Point of Contact (POC) at your primary and secondary facility to schedule a meeting to discuss with the facility scientist(s) before proposal submission to discuss capabilities and to identify possible problems in integrating external equipment with the LaserNetUS facility and to determine possible solutions. Note that additional experimental details of short-listed or awarded experiments will be requested at a later date. Thus, very fine details of the experiment do not need to be captured within the main proposal.We make every effort to award experiments at the primary facility as we understand it is difficult to design and write a proposal that covers the complexities and differences at two different LaserNetUS facilities within the 6-page limit. **The PRP will rank a proposal for the primary facility that was requested and will only consider it at the secondary facility if it was not competitive at the primary facility. If a proposal was not competitive at the primary or secondary facility, the PRP may recommend an alternative facility if available. In this case, the Spokesperson may accept or decline the transfer to the alternative facility.** Questions which will be used in the evaluation of the proposal:* What is the primary and secondary LaserNetUS facility?
* Why is the primary LaserNetUS facility essential for this experiment? Be specific about the most important (unique) capabilities, instrumentation, expertise, partnerships, etc. that will enable the proposed experiment.
* What is the experimental set-up and/or procedure?

Consider the following additional questions, as applicable, to guide your writing: * What previous experiments or development work has been performed? Describe any preliminary results, simulations, designs, or supporting experiments.
* What are the key elements of the proposed experimental set-up which are required for the successful execution of the experiment?
* If your proposed work relies on high-repetition rate to obtain a statistically significant measurement, what are the anticipated data rates?
* What additional key equipment (i.e., equipment that is not presently available at the LaserNetUS facility) is needed, including laser, detector, sample delivery/environment, temperature, pressure, etc.? What are the plans and timeline for securing this additional equipment (e.g., through collaboration, upcoming purchases)?
* How soon do you anticipate being ready for the experiment if notified in Spring 2023? This information will be used for scheduling purposes only and will not impact the ranking of your proposal by the PRP.
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**Feasibility assessment for Primary Facility**

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| **Feasibility assessment for Primary Facility Character Limit: 2,000**Required: 1 setup schematic, 1 table describing experiment scheduleBriefly describe the experiment setup or geometry. Provide a schematic diagram including key equipment and laser beam paths. The Point of Contact at each LaserNetUS facility can provide additional information and recommendations if assistance is required.Each facility has table of key laser parameters on the LaserNetUS website: <https://lasernetus.org/facilities/>. Describe the required laser parameters such as wavelength, focal spot quality, repetition rate, pulse contrast, pulse energy, and pulse duration required for the proposed experiment. If anything beyond the parameters listed in the parameter table are required (e.g. polarization, bandwidth, chirp, etc.), provide a detailed description. Specify any timing and synchronization requirements. Describe the targets and/or samples which will be used. Include any non-standard sample preparation, storage, or alignment that is required.Describe any additional resources required (e.g., access to local facilities, labs, advanced testing, unique sample preparation, delivery storage requirement.)Describe any known risks which may prevent the successful execution of the proposed experiment such as sourcing targets, equipment (e.g., availability of equipment that will be loaned from another institution), or materials (e.g., new/untested manufacturer, long lead times). Are there any potential changes in personnel availability (e.g., PhD student graduating) during the cycle which determine when the experiment could be performed?Provide a table outlining the experiment schedule. The typical experiment duration awarded by LaserNetUS varies by facility – please discuss the number of days/shifts that should be requested for your experiment with the facility Point of Contact prior to submitting the proposal. |


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Figure 3: Setup figure. Describe main laser beam path, components, critical diagnostic placements, etc.

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| Week 2 | Interdum et malesuada fames ac ante ipsum primis in faucibus. |

Table 1: Proposed experimental schedule

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| Before preparing the experiment schedule, we strongly recommend discussing the typical set-up and experiment lengths with the facility point of contact.The experiment schedule table should provide details such as:* access/facility support (e.g., Week 0: microscope lab access required to mount and inspect targets, Week 1: sonicator required daily from 4-6PM)
* targets (e.g., Week 1: scan target thickness using 0.1-10µm Al foils mounted on standard target frame)
* laser requirements (e.g., Week 1: max energy, best compression, Week 2: 50% energy, best compression)
* scans to be performed (Week 2: scan delay between pump and probe laser in steps of 0.1ps from -2.5 to 15 ps to collect interferometry data)
* expected number of shots (e.g., Week 0: 10 test shots, Week 1: 400 shots/day)
* major milestones (e.g., by the end of Week 1, the Thomson Parabola will be installed, aligned, and calibration shots will be complete)
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**Feasibility assessment for Secondary Facility (Optional)**

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| **Feasibility assessment for Secondary Facility Character Limit: 1,000**Provide a summary of your assessment of the feasibility of this experiment at the secondary facility specifically focusing on any changes that would be required from the experimental design and/or scope if awarded time at the secondary facility. |

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**Scientific Ecosystem Stewardship and Broader Impact**

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| **Scientific Ecosystem Stewardship and Broader Impact Character Limit: 2,000**Workforce development and expanding the scientific ecosystem around the use of high-power lasers are key missions of LaserNetUS. In this section, we would like you to provide context for how the proposed work supports these values.Questions which may be used in the PRP’s evaluation of the proposal:* Does this proposal provide academic or training opportunities to students or early career researchers? If so, are the results of the proposed experiments for a thesis project?
* What is the intended audience for these results? What is the venue or format that the experimental results will be shared?
* Describe how this proposal will increase or sustain community interest in the topical area (e.g. follow up experiments, new funding applications/research programs)?
* To what extent does this proposal engage underrepresented groups or institutions?

Other questions you can consider, if applicable:* Does this proposal engage with a new research group or institution that has not previously been involved with LaserNetUS?
* To what extent will the project enhance the scientific, technical, or engineering infrastructure of LaserNetUS and result in a potential asset for the larger community?
* Is the proposed work from a topical area which has not yet been awarded time through LaserNetUS?
* Is the proposed experiment part of a larger project or program (e.g., NNSA Center of Excellence, Laboratory Directed Research and Development (LDRD), multi-institutional agreements.)
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**Appendix I: References**

[1] A.N. Author, “*Title,*” Journal. volume, page (year); doi

[2] A.N. Author, “*Title,*” Journal. volume, page (year); doi

[3] A.N. Author, “*Title,*” Journal. volume, page (year); doi

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# Appendix II: Tentative Research Team

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Experiment Participation | First Name | Last Name | Email | Primary Affiliation | Secondary Affiliation (if applicable) | Career Level | Tentative Role |
| On-site, remote support, not attending |  |  |  |  |  | Select from (12) options below | Select from (4) options below |
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**Tentative Research Team Supporting Narrative**

**First Name Last Name (Lead-PI)** e.g has previously designed and led short pulse experiments using the ALEPH and Titan lasers. They have extensive experience in developing laser-pulse contrast enhancement setups1,2 and the generation and characterization of high-harmonic sources.3

**First Name Last Name (role, responsibility, task)** lorem ipsum dolor sit amet, consectetur adipiscing elit. Aliquam sapien massa, ultrices quis nisi non, gravida tincidunt lectus. Integer maximus eget ipsum nec interdum. Vivamus convallis eget tellus sed bibendum.

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2A.N. Author, “*Title,*” Journal. volume, page (year); doi

3A.N. Author, “*Title,*” Journal. volume, page (year); doi

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| --- |
| **Tentative Research Team Supporting Narrative Character Limit: 1,000 characters**User support varies significantly at the various LaserNetUS facilities. In some cases, the technical feasibility of your proposal will depend on the number of on-site personnel and their previous experience. This table will be used by the facilities to assess the technical feasibility and likelihood of successfully executing the experimental goals. Definitions of experiment participation:* On-site: individuals who will travel to the LaserNetUS facility to perform or supervise hands on work in the laboratory before or during the scheduled experiment
* Remote support: can vary by team but may include individuals who perform remote data analysis, supervision, coordination, or observation
* Not attending: individuals involved in other aspects such as pre-experiment design or post-experiment analysis and interpretation

For the key personnel on the tentative research team (e.g., Lead-PI, personnel who will field primary diagnostics, overall supervision), provide 1-3 sentences detailing:* What is their role, responsibilities, or expected tasks?
* Where or how did the individual obtain the experience necessary for the proposed experiment? Provide description or references to publications.
* If applicable, what training or assistance will be required from the local facility personnel for their role, responsibilities, or expected tasks?

This list should exactly match the participants entered in the proposal submission portal. Please select from the following options for Career Level and Tentative Roll options: |
| Career Level:1. Undergraduate Student
2. Graduate Student
3. University Postdoctoral Researcher/Fellow/Scholar
4. University Research Associate
5. University Scientist
6. Laboratory Postdoctoral Researcher/Fellow/Scholar
7. Laboratory Research Associate
8. Laboratory Scientist
9. Assistant (Research) Professor
10. Associate (Research) Professor
11. (Research) Professor
12. Other
 | Tentative Role:1. Experimental
2. Theory and Simulations
3. Supervision and Coordination
4. Other (please specify)
 |

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**Appendix III: Technical Parameter Table**

|  |  |  |
| --- | --- | --- |
| Parameter | Description | Comments/References |
| Target/Sample |  |  |
| Primary Measurement(s) |  |  |
| Secondary Measurement(s) |  |  |
| Laser Energy (J) |  |  |
| Laser Pulse Duration (fs/ps/ns) |  |  |
| Laser Focal Spot Size (µm) |  |  |
| Setup length (# of days) |  |  |
| Experiment length (# of days) |  |  |
| Other |  |  |

|  |
| --- |
| While this is a duplication of information requested in the body of the proposal, it will be used as a quick reference during the proposal review process. Please capture the key elements and details of the experiment execution in this table. Feel free to update/add additional categories as needed.  |

**Appendix IV: Target Support Request**

|  |
| --- |
| Applicants can now request target fabrication support from the LaserNetUS Target Fabrication Node at the University of Michigan. In order to evaluate your request, it's essential that you provide detailed information that allows us to assess cost, complexity, lead times, and potential safety risks. The University of Michigan's role is primarily as an assembly lab with the ability to do high precision machining, component manufacturing, and procurement. Please contact Sallee Klein (salleer@umich.edu) to discuss your target needs and provide the following information:* Clearly state if you are using an existing target design or if any development is required.
* Include target diagrams that feature materials, precise dimensions, and the quantity of assembled targets desired.
* Specify tolerances for all dimensions, ensuring that measurements are as accurate as needed.
* Define acceptable surface roughness if it's a critical parameter for your experiment.
* Define the glue layer thickness/quality and/or glue spot size/quality if they are essential parameters.
* Provide quotes and lead times, where known and appropriate, for required materials or components.
 |



Figure: Target diagrams from multiple views with materials, dimensions, and tolerances specified.