



Laser-Induced Damage in Optical Materials 2022 (LD100)

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MATERIALS AND MEASUREMENTS

Damage to the bulk of transparent optical media can occur in amorphous, polymeric, polycrystalline or crystalline materials. Characterization and measurements of damage threshold including methods of test procedures, data reduction, systems considerations, and international standards are reported. Also, characterization of basic materials properties, such as absorption, thermal conductivity, stress-optic coefficients, moduli and defects is in the focus of this section. With the emergence of nanostructured materials, the relationship between the propagating laser flux and engineered nanostructures becomes another topic of interest.

SURFACES, MIRRORS, AND CONTAMINATION

Optical surfaces often limit the fluence of an optic due to intrinsic and extrinsic flaws and defects. Proper surface preparation, subsurface damage control, roughness and scattering reduction, environmental degradation and aging prevention, and contamination control can improve the performance of mirrors, diffraction gratings, substrates for multilayer coatings, and other surfaces.

THIN FILMS

Because of the tremendous range of applications of optical multilayers for modifying the performance of optical measurements, and because thin films are generally the weakest part of optical systems, research into more damage-resistant thin films is a vibrant area. In addition to damage thresholds, researchers are interested in advanced film-deposition technology, contamination, film structure, film design, and film response to various environmental attacks and aging.

Keynote: **Daniel Kramer**, ELI Beamlines (Czech Republic)

FUNDAMENTAL MECHANISMS

Topics range from the basics of photon-matter interaction to nonlinear propagation. Emphasis is on nonlinear behavior; for example, multiphoton effects, nonlinear refractive index, and self-focusing. This area also includes modeling, such as thermal behavior of defect-initiated damage and the interplay between elements in an optical train that affect performance and hence damage.

MINI-SYMPOSIUM ON APPLICATION OF METASURFACE OPTICS FOR USE WITH HIGH-POWER LASERS

Chaired by: **Eyal Feigenbaum** and **Wren Carr**, NIF and Photon Science, Lawrence Livermore National Laboratory (United States)

This Mini-Symposium will review recent developments in the fields of metasurface with potential applications for use in high-power lasers and optics. Metasurface optics enable superior optical elements design through improved wavefront control, consolidation of optical elements, and precise control of other optical properties (such as birefringence) which allows for dynamic spatial modulations of these properties. High-power lasers could substantially benefit from these advancements (e.g., reducing filamentation risk by thinning the optics, increasing throughput on target by addressing higher order aberrations, and enabling high-speed laser beam scanning using no-moving-parts tunable metasurface), but also require special consideration to the limitations imposed by Laser-induced damage (LID). Engaging the laser-damage and metasurface communities in collaborative efforts to study LID issues specific to the nano-scale structure and the materials composing the metasurfaces offers great potential for resolving these limitations and advancement towards high-power applications. As a part of this event, the following invited talks are planned:

Invited Speakers: **Prof. Harry A Atwater**, Thomas J. Watson Laboratory of Applied Physics and Materials Science, California Institute of Technology (United States)

Prof. Federico Capasso, Harvard John A. Paulson School of Engineering and Applied Sciences, Harvard University (United States)

CW 1064 NM MIRROR THIN FILM DAMAGE COMPETITION

Coordinated by: Raluca Negres, Christopher J. Stolz, Lawrence Livermore National Lab. (USA)

A double-blind laser damage competition will be held to determine the current laser damage resistance of 1064-nm, normal incidence multilayer mirrors designed for CW (continuous wave) operation. The results will be shared at SPIE Laser Damage 2022. The mirrors must meet the following requirements:

- Reflectance > 99.5%
- Wavelength 1064 nm
- 0 degrees incidence angle
- Environment: Ambient air
- Wavefront Quality

ABSTRACT SUBMISSION GUIDELINES

Present your research at SPIE Laser Damage

Below are abstract submission instructions, the accompanying submission agreement, conference presentation guidelines, and guidelines for publishing in the Proceedings of SPIE on the SPIE Digital Library. Submissions subject to chair approval.

Important dates

Abstracts due	4 May 2022
Authors notified and program posts online	24 June 2022
Submission system opens for manuscripts and poster videos/PDFs*	TBD
Manuscripts due	21 October 2022

*Contact author or speaker must register prior to uploading.

What you will need to submit

- Title
- Author(s) information
- 250-word abstract for technical review
- 100-word summary for the program
- Keywords used in search for your paper (optional)
- Check the individual conference call for papers for additional requirements (for example, some conferences require two- to three-page extended summary for technical review, or have instructions for award competitions)

Note: Only original material should be submitted. Commercial papers, papers with no new research/development content, and papers with proprietary restrictions will not be accepted for presentation.

How to submit your abstract

- Visit the conference page: www.spie.org/ld101call
- You may submit more than one abstract but submit each abstract only once.
- Post-deadline submissions: Click the title of the conference to view the full description and submit by clicking the “Additional Information” tab and then the “Submit An Abstract” button on that page.
- Sign in to your SPIE account or create an account if you do not already have one.
- Follow the steps in the submission wizard until the submission process is completed.

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All presenting authors, including keynote, invited, oral, and poster presenters, agree to the following conditions by submitting an abstract:

- Register and pay the author registration fee
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- Submit a four-page-minimum manuscript by the advertised due date, for online conference viewing during the event and publication in the Proceedings of SPIE in the SPIE Digital Library
- Obtain funding for registration fees, travel, and accommodations, independent of SPIE, through their sponsoring organizations
- Ensure that all clearances, including government and company clearance, have been obtained to present and publish. If you are a DoD contractor in the USA, allow at least 60 days for clearance
- Attend the meeting
- Present at the scheduled time

Review and program placement

- To ensure a high-quality conference, all submissions will be assessed by the conference chair/editor for technical merit and suitability of content
- Conference chairs/editors reserve the right to reject for presentation any paper that does not meet content or presentation expectations
- Final placement in an oral or poster session is subject to chairs' discretion

Publication of Proceedings in the SPIE Digital Library

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