

Findings and Recommendations: 2023 OLUG Workshop

Overview: Total requests = 27

General = 5

Beams = 5

Diagnostics = 12

Targets = 5

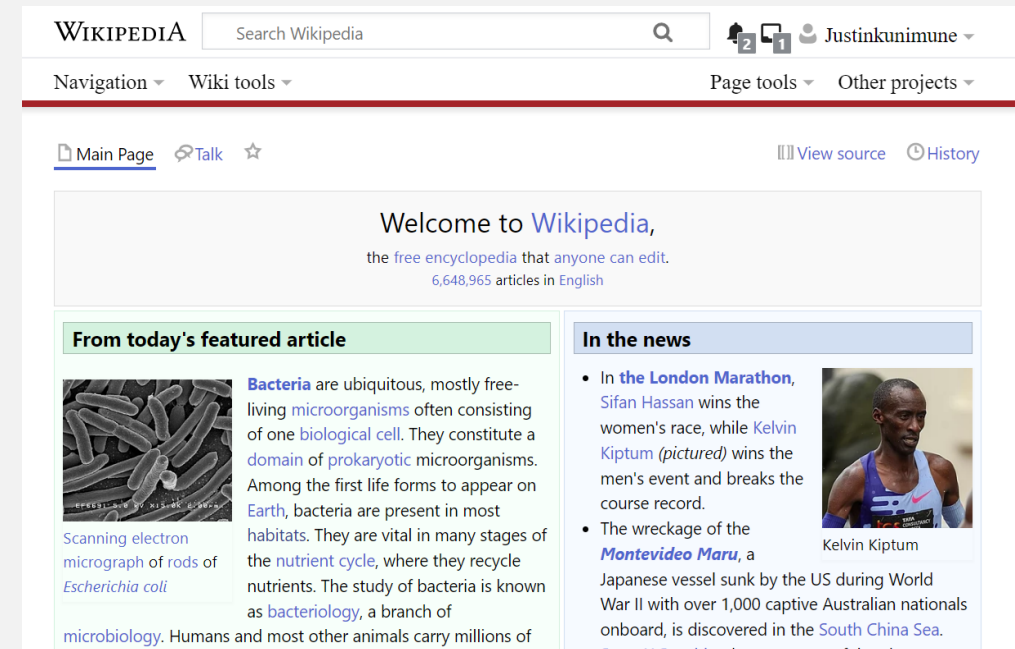
General

1. Increase user information accessibility

- Make information accessible for new/less experienced users (non-password) + additional information and tools for users:
 - Website:
 - PI training materials, FAQ, etc.
 - List of contacts willing to help w/ PI shadowing, specific experimental platform questions, etc.
 - List of internships/grants/jobs etc...
 - These last two could be addressed through the wiki (next F&R)
- Impact of requested capability: Increase accessibility, centralize information, optimize campaign performance, etc.
- Proposal sponsor: UCSD (Pia Valdivia - mpvaldivialeiva@ucsd.edu), LANL (V. Geppert-Kleinrath - verena@lanl.gov)

2. An OMEGA MediaWiki and/or Q&A forum to crowdsource guides and reference materials

- Background: Running shots at OMEGA requires a lot of knowledge, which can currently only be obtained through a combination of attending trainings, emailing specialists, digging through documentation, and reading GitHub repos.
- Capability requirements: Host a MediaWiki (or alternatively a Stack Exchange-like Q&A forum) written by OMEGA users and personnel for OMEGA users and personnel, with pages about diagnostics, platforms, analyses, and users and personnel.
- Impact of requested capability: Use of the OMEGA facility would be far more accessible to new users who don't yet have connections to personnel, as getting simple questions answered would be as easy as searching a webpage.
- Proposal sponsor: Justin Kunifuune, MIT, supported by entire community



Homepage of Wikipedia, the world's most popular MediaWiki

3. PI training week - more in-depth information for running shots

- Motivation: **Students feel that current PI training is insufficient**
- Requested capability: Better training. (Suggestions: In person. Week before OLUG includes training or LLE staff availability to folks who have recently taken PI training. Forum for questions. Connect mentors with new PIs.)
- Capability requirements:
 - Access to LLE personnel
 - Coordination of effort/what information do people want to see
 - List of people interested in this
- Impact of requested capability:
 - Improve effectiveness of PI training
 - Support new students beginning to run Omega/Omega EP experiments
- Proposal sponsor: Heath LeFevre via student panel (UMich)

4. Access to Omega-60 through LaserNetUS

- Requested capability: Access to the Omega-60 facility through the LaserNetUS program
- Capability requirements:
 - Currently, LaserNetUS only has access to Omega-EP
 - FES is starting an IFE Program and has restricted LaserNetUS time on Omega to IFE-relevant work
 - Omega-60 would provide more access to IFE-relevant regimes (ie cryogenic fuel, direct drive implosions etc)
 - Alternatively, NLUF time could consider IFE work in its facility time solicitation
- Impact of requested capability: The Omega-60 schedule is predictably constrained so allocating time to LaserNetUS would be challenging
- Proposal sponsor: Carolyn Kuranz ckuranz@umich.edu

5. Integration of pulsed power capabilities with Omega/Omega-EP & FLUX operations*

- **Requested capability:** With the development of an intermediate pulsed power driver (~5 MA) developed at the Laboratory for Laser Energetics, offering the capability to use the PPD in tandem with the Omega/Omega-EP laser system (+beam upgrades)
- **Capability requirements:**
 - The PPD is capable of operations for their own experimental campaigns as a standalone
 - Construction of somehow redirecting beam and beam geometry into the target chamber for PPD target
- **Impact of requested capability:** The impact would be manifold for laser-PPD combined science
 - The driver coupling of two such drivers would enable a new, and accessible regime for plasma physics and HEDP science, along with fusion schemes
 - Testing bed for experiments on Z, opening up potentially more shots for related Z experiments and collaboration with LLE
 - Smaller pulser for imaging; providing new x-ray source capabilities
- **Proposal sponsor:** Sandia National Laboratories, contact: Marissa B. P. Adams mbadams@sandia.gov; University of California, San Diego, contact: Pia Valdivia mpvaldivialeiva@ucsd.edu

*The goal of this request is to socialize the concept and discuss how OLUG and user programs would adapt to these new capabilities

Beams

6. Display requested beams from min to max in SRF Omega 60

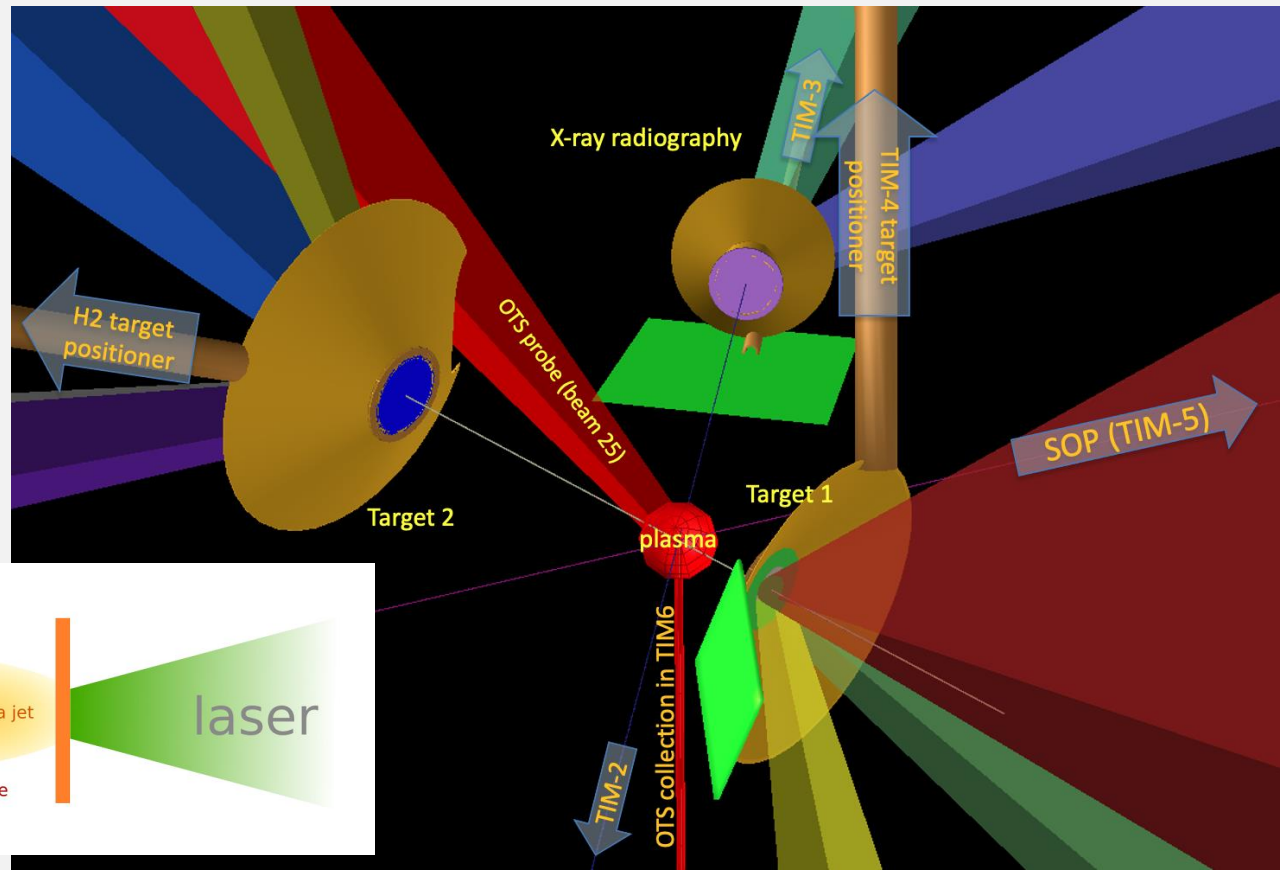
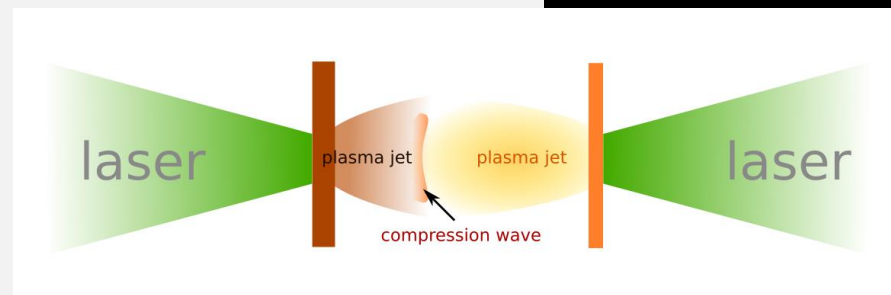
- Motivation: confusing which beams are added or if the request was recorded
- Capability request: Display requested beams from min to max in SRF Omega 60
- Impact: less confusion

- Proposal sponsor: Derek Schaeffer (UCLA), Vicente Valenzuela-Villaseca (Princeton)

7. 3rd driver on Omega-60

- Requested capability: 3rd driver so that each Leg on Omega 60 has a separate capability for long independent timing (long delay, >10 ns up to 100 ns) and pulse shape
- Motivation: 2 separate drives and one long delay backlighter or one drive and to backlighter with long delay and/or different pulse shapes with multiple targets
- Impact of requested capability: It will make more experiments possible for long delay probing, long plasma development, laboratory astrophysics, more probing options (e.g. OTS)
- Proposal sponsor: Katerina Falk (HZDR, Germany), Peter Heuer (LLE), Alison Saunders (LLNL) - k.falk@hzdr.de

Example: Colliding counter propagating jets with OTS, x-ray and proton radiography



8. Increase possible time delay between UV drive beams on OMEGA EP to >650 ns

- Motivation: for many HED experiments, the relevant velocities are slow (~ 1 $\mu\text{m}/\text{ns}$) and the relevant distances are long (~ 1 mm). In order to image events happening at these times/distances, a longer time delay is necessary
- Capability request: Increase the possible timing delay between two UV drive beams on EP to 1 μs (± 10 ns)
- Impact: This would increase the possible range of material studies available for HED campaigns, including the existing ejecta campaign.
- Proposal sponsor: Alison Saunders (LLNL), Pia Valdivia (UCSD)

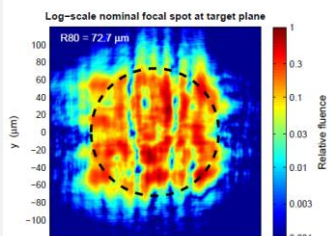
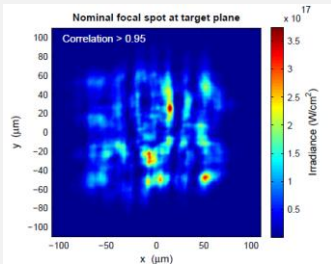
9. Add beam timing at long timing delays on EP

- Motivation: Currently, UV Ross diagnostic doesn't provide information on beam timing when long timing delays (100 ns +) are requested between UV drive means on EP
- Capability request: Add beam timing capability at long delays >100 ns to ± 10 ns
- Impact: This would significantly reduce timing uncertainties in imaging experiments with long delays, which would allow for increased resolution of key data diagnostics (e.g. particle velocities that are based on time-of-flight measurements)
- Proposal sponsor: Alison Saunders (LLNL), Heath Lefevre (UMich)

10. Better short-pulse reproducibility (Omega EP)

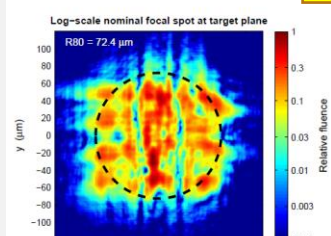
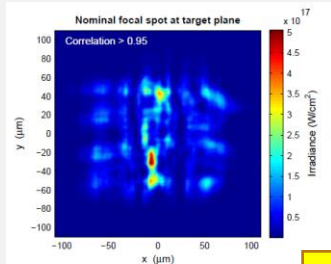
- Requested capability: Improve x-ray backlighter quality for diagnostics that require reliable and reproducible x-ray sources within campaigns AND from campaign to campaign
- Capability requirements: IR DPP for defocused short pulse beams or another method to increase reproducibility of beam profile, i.e. reliable performance that does not involve increasing pulse duration (maintain diagnostic time-resolution)
- Impact of requested capability: Better data quality and efficiency from diagnostics/platforms such as: Talbot-Lau X-ray Deflectometry (TXD), cryoBL, etc.
- Sponsor: UCSD (Pia Valdivia - mpvaldivialeiva@ucsd.edu) + LLE (Christian Stoeckl) + EuXFEL (Victorien Bouffetier) + U. de Valladolid (Gabriel Perez-Callejo) + LLNL (Matt Hill)

Best

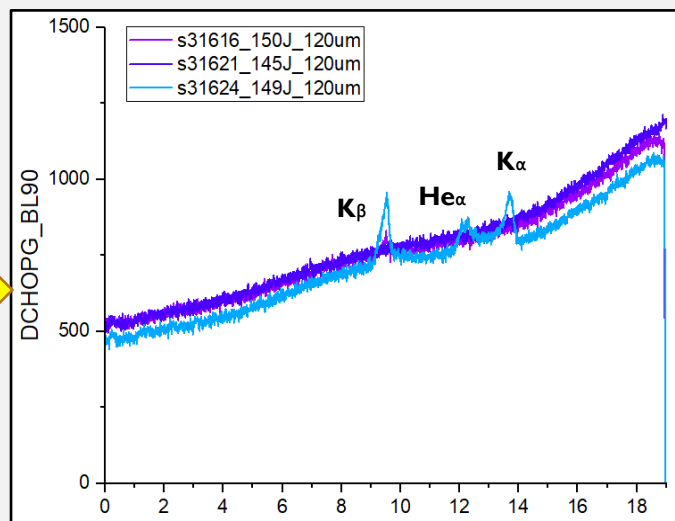


S31616

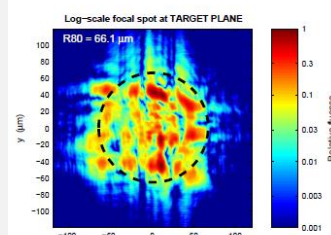
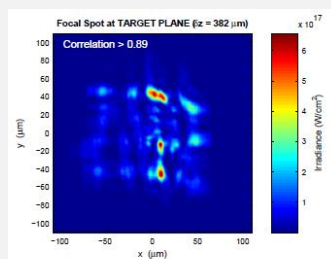
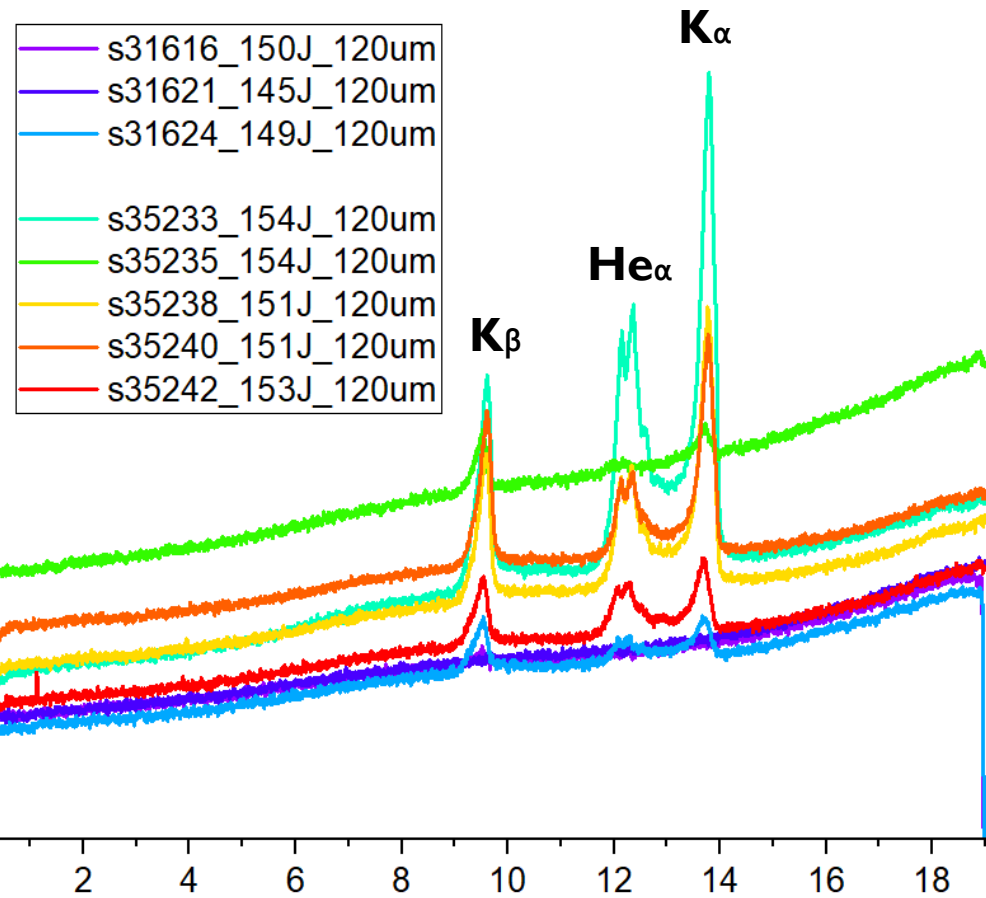
Worst



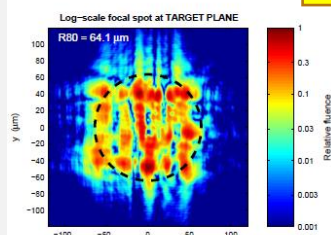
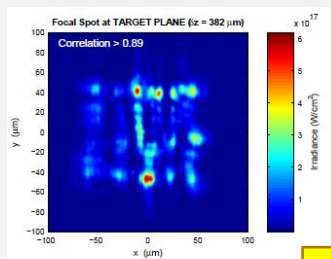
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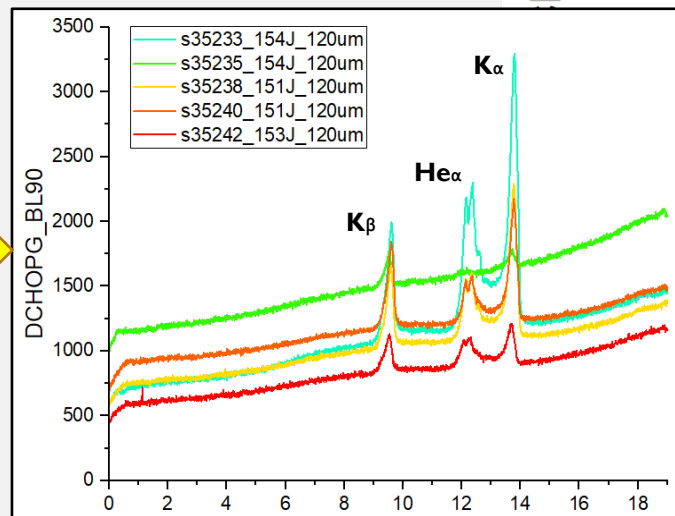
HOPG_BL90



S35233



S35235



Diagnostics

11. Film digitization currently takes 3 months

- Motivation:
 - one film scan takes 8 hrs but delay of over 3 months.
- Capability request:
 - Need faster scanning.
 - Possibly a faster quick look scan at low resolution
- Impact: make decisions for next shot day within campaign
- Proposal sponsor: Enac Gallardo-Diaz (enacgallardo@Nevada.unr.edu) University of Nevada Reno

12. Interstrip timing for framing cameras on shot images and reports

- Background:

- There are large variations between recorded interstrip timing for framing cameras and their nominal (requested) values
- Currently it is necessary to ask for the recorded interstrip timing from LLE staff directly (only nominal timing is included on the shot images and reports page)

- Capability requirements:

- Add the interstrip timing analysis directly to shot images and reports
- Add a description of the timing information (uncertainties, etc) to the user handbook for SFC3

- Impact of requested capability:

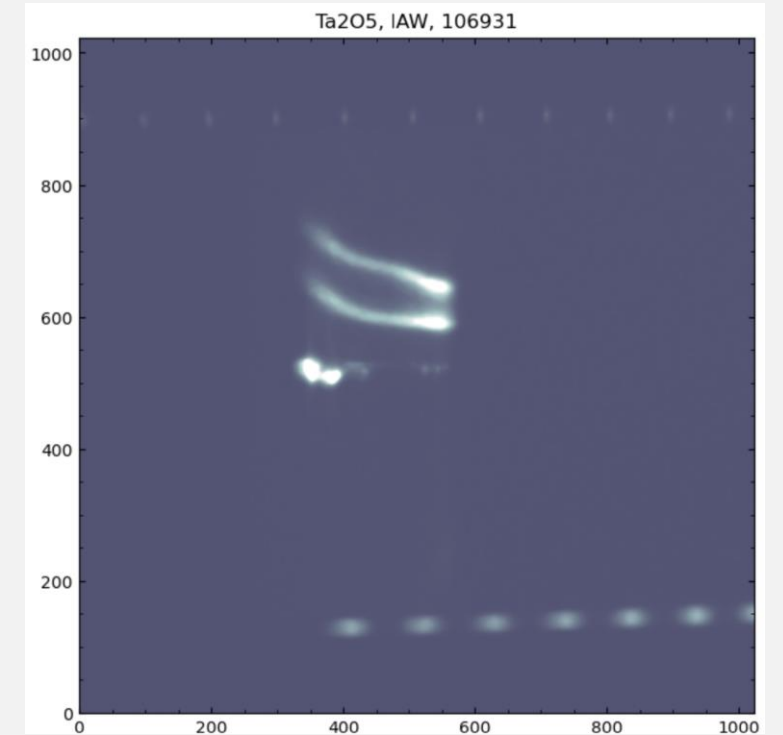
- accurate co-timing of SFC3 to other diagnostics

- Proposal sponsor:

- Tucker Evans, MIT, Plasma Science and Fusion Center, Verena Geppert-Kleinrath (LANL), Heath Lefevre (UMich)

13. Fiducial timing and dispersion information for time-resolved Thomson scattering on shot images and reports

- Background:
 - Time-resolved Thomson scattering diagnostics record EPW and IAW light streaks, with timing fiducials above and below the signals
 - Currently it is necessary to ask for the wavelength dispersion and fiducial timing from LLE staff directly
- Capability requirements:
 - Add the fiducial time spacing and wavelength dispersion directly to shot images and reports
 - Add a description of the timing information (uncertainties, etc) to the user handbook for Thomson scattering
- Impact of requested capability:
 - Accurate timing information and wavelengths for Thomson scattering lineouts
- Proposal sponsor:
 - Skylar Dannhoff, MIT, Plasma Science and Fusion Center



14. Add additional TPIE

- Motivation: want to be able resolve charged particle energy spectra from multiple angles (multiple TIMS/lines of sight)
- Capability request: add a second TPIE, or equivalent diagnostic that can be used simultaneously
- Impact: this would allow for a more comprehensive understanding of the acceleration of ions from Omega experiments by having multiple viewpoints on the target chamber center. Useful for the direct laser acceleration of electrons campaign and understanding electron channel fields, and other relevant experiments
- Proposal sponsor: Veronica Contreras (U. Michigan), Johan Frenje (MIT), Matt Selwood (LLNL)

15. Long LoS diagnostic port(s) on EP

- **Motivation:** Ability to have higher magnification images of neutron sources, and access to more neutron diagnostics already used on OMEGA-60
- **Capability Request:** A longer line of sight to TCC, with the ability to mount diagnostics outside the chamber
- **Impact:** Can field a host of new experiments using;
 - OMEGA-60 neutron diagnostics like NTD
 - higher magnification images in x-ray and neutron (aperture in chamber, camera outside chamber) to increase diagnostic resolution
 - time-gated neutron diagnostics
 - Neutron, x-ray, proton or electron radiography of larger objects
- **Proposal sponsor(s):** Matt Selwood (LLNL), Tim Wong (LANL)

16. Add collimators to EP NTOFs

- **Motivation:** To be able to ensure neutron signal is from TCC, and prevent NTOF saturation
- **Capability Request:** Add collimators to the EP NTOFs, as found on 2 of the OMEGA-60 NTOFs
- **Impact:** Prevent saturation by background of EP NTOFs, and therefore better understanding of short-pulse produced neutron sources
- **Proposal sponsor(s):** Matt Selwood (LLNL), (LANL) Tim Wong

[joint idea: Maria Gatu-Johnson / MIT requesting more NTOFs on OMEGA-60, could they be added on the shared wall and be used interchangeably on 60/EP?]

17. Gate valve for NTD nosecone swapping

- Background:

- Several nosecones have been designed for NTD to allow for co-timed measurement of nuclear products
- Currently NTD nosecones can only be swapped out once per week

- Capability requirements:

- Ability to swap out nosecones within shot cycle (similar to current PXTD format)
- Bang-time diagnostic for backlighter to aid proton radiography

- Impact of requested capability:

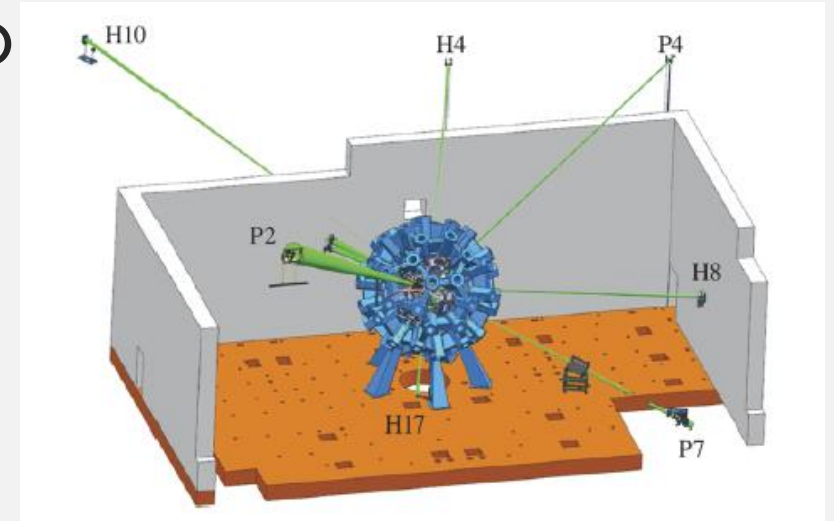
- Co-timing for nuclear emission histories for a broad selection of shot days

- Proposal sponsor:

- Tucker Evans, MIT, Plasma Science and Fusion Center, supported by LANL (Yongho Kim), Warren Garbet (LANL)

18. Capability to infer directional flow vector on D₂-gas-filled or low DT yield implosions

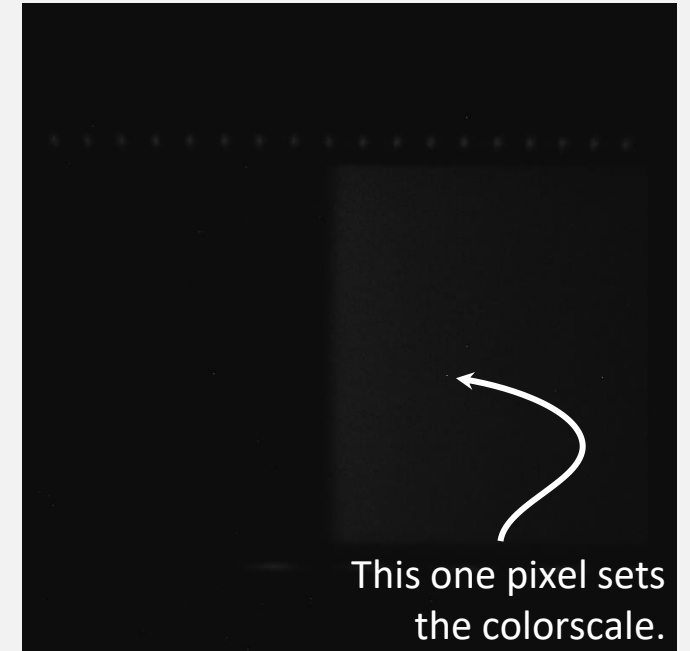
- Background: LLE has developed capability to measure a 3D flow vector in implosions with DT yield $1e13$ - $2e14$, using nTOF detectors in multiple lines-of-sight (Mannion et al., Rev. Sci Instrum. 92, 033529 (2021))



- Capability requirements: Implementation of two new absolutely timed nTOF detectors to make this measurement possible in D₂-gas-filled and lower yield DT implosions (four detectors are required but two already exist); DD yield $>\sim 5e9$, DT yield $5e11$ - $1e13$
- Impact of requested capability: New results would be used to constrain implosion conditions for, e.g., ICF, kinetic, nuclear, and transport physics experiments
- Proposal sponsor: Maria Gatu Johnson, MIT (with MIT, Imperial, LANL, SNL, and LLE collaborators)

19. Better colormap bounds on *Shot Images and Reports*

- Background: On *Shot Images and Reports*, an image can be viewed as a heatmap. Many diagnostics produce images with very small and bright spots. Because the default colormap scales to the minimum and maximum of the image, these small bright spots can make the important features of the image appear faint or even invisible.
- Capability requirements: If the plot automatically scaled its colormap to the 0.1th percentile and 99.9th percentile rather than the minimum and maximum (or some similar scheme), images would be more generally visible.
- Impact of requested capability: Data would be easier to interpret on *Shot Images and Reports*.
- Proposal sponsor: Justin Kunimune, MIT, supported by the entire community



20. OTS Diagnostics on EP (additional info in backup slides).

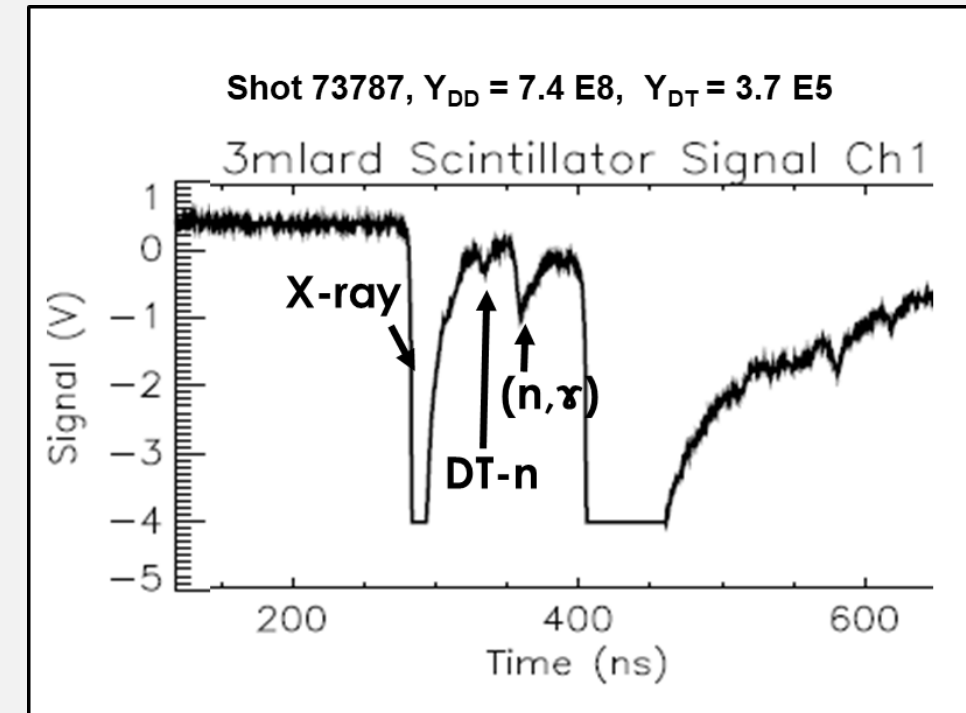
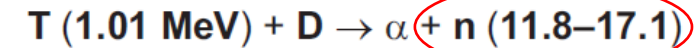
*from 2022

- Requested capability: Many experiments elect to use Omega 60 because it is the only LLE facility with optical Thomson scattering (OTS), often vastly underutilizing the facility's laser capabilities because only a few beams are needed. These experiments would be better suited for EP, but no TS capability currently exists. While an independent OTS system similar to that on OMEGA 60 would be ideal, additional (cheaper) options utilizing the 3w beams and/or existing diagnostics should also be explored.
- Capability requirements: Add an OTS diagnostic of similar form and functionality as that on OMEGA 60, coupled with streaked and/or imaging detectors. Alternatively, explore ways to utilize existing components on EP, such as pairing a 3w beam with a suitable spectrometer and streak camera. Compared to an independent system, using existing components will likely sacrifice some scientific capability (such as measuring IAW features).
- Impact of requested capability: Experiments on EP would benefit from the powerful diagnostic capabilities afforded by OTS. Localized OTS measurements would also complement the global images provided by the current 4w probe beam.
- Proposal sponsor: HZDR, PPPL, GA, Imperial
- Proposal support: K. Falk (HZDR), M. Manuel (GA), S. Zhang (PPPL), M. Bailly-Grandvaux (UCSD), D. Schaeffer (Princeton), C. Walsh (LLNL), G. Kagan (Imperial). *Potential dual benefit of enabling new capabilities for LPI studies (transmission beam diagnostic) – M. Bailleux-Grandvaux, USCD

21. Request for capability for nTOF detectors to measure secondary DT-neutron spectra **from 2022*

- Requested capability: measure secondary DT-n yields and spectra at yields $>\sim 5e5$, in presence of a strong x-ray background signal
- Background: Secondary DT-n are routinely measured with the 3mLARD nTOF but X-ray and (n- γ) background are too significant for an accurate measurement. We need an n-TOF that is more sensitive to DT-n and insensitive to photon background.
- Benefit of capability: Secondary DT-n yield measurement will allow accurate inference of fuel ρR ; spectral measurements will help diagnose fuel magnetization.
- Interested parties: Any user who uses D^3He or D_2 gas-filled implosions. P.Adrian, N. Kadabi et al. (MIT), M. Bailleux-Grandvaux (USCD), ...

- The secondary neutrons are created in reactions:



22. An additional TPS, more (mini)TIMs, and/or NDIs, for OMEGA *from 2022

- Background:
 - OMEGA currently has six TIMs and one available NDI (nuclear diagnostic inserter)
 - This frequently forces users to downselect diagnostics to use for their experiments
 - Having an additional target positioner will often free up a TIM for other diagnostics
- Requirements: Capability for fielding additional TPS, TIMs and/or NDIs
- Impact of requested capability: Would improve characterization of experiments/generate more output data for each shot
- Proposal sponsor: Johan Frenje, MIT

Targets

23. Front light the TVS views

- Motivation: Targets with complex geometry and features can be difficult to position in the target chamber
- Capability request: Front light the TVS views
- Impact: Easier identification of key alignment features that otherwise wouldn't be visible. More accurate positioning of complex targets with different offsets.
- Proposal sponsor: Thomas White (University of Nevada, Reno), Johan Frenje (MIT), Pia Valdivia (UCSD), Petros Tzeferacos (LLE), anyone with complex targets

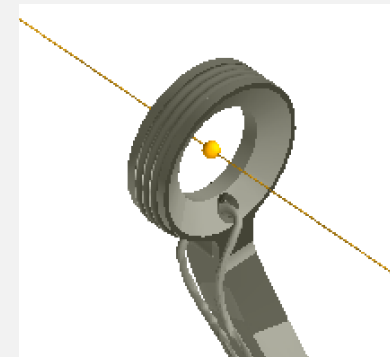
24. Improved target alignment capabilities for targets away from TCC

- Motivation: Targets with complex geometry and features can be difficult to position in the target chamber
- Capability request: Better resolution and increased depth of field away from TCC (4 mm DOF @ <50 microns resolution, up to 10 mm away from TCC).
- Impact: Easier identification of key alignment features that otherwise wouldn't be visible. More accurate positioning of complex targets with different offsets.
- Proposal sponsor: Thomas White (University of Nevada, Reno), Alison Saunders (LLNL)

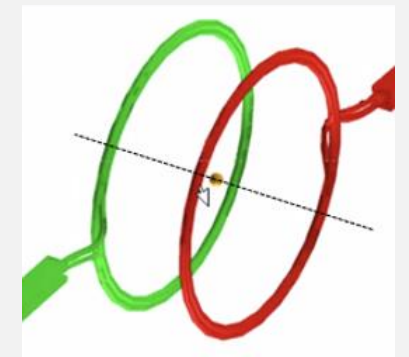
25. MIFEDS Gen-3 implementation for very high initial B-fields

- Background: The MIFEDS high-voltage pulser system has been very successful in providing external B-fields to HEDP experiments for fields up to ~ 10 T (spherical geometry) and ~ 50 T (asymmetric geometry), but higher fields are required for some experiments.
- Capability requirements: Need a high-voltage pulser/ coil system that can provide up to 80 Tesla fields
- Impact of requested capability: Accessing an HED plasma regime where both ions and electrons are highly magnetized would enable unique studies of energy and particle transport.
- Proposal sponsor: Cody Chang (MIT), Derek Schaeffer (UCLA), Villaseca (PPPL), Bolanos (UCSD)

Asymmetric exp
($< \sim 50$ T)



Symmetric exp
($< \sim 10$ T)



26. Planar Cryo on EP

- Requested capability: Add Planar cryo at EP
- Capability requirements: enable cryogenic D2 and He (if possible) experiments
- Impact of requested capability: Enable new experiments eg MagLiF, IFE, EOS , optical properties, release studies, fast-ignition, provide greater range and control of isochoric heating and enable optimizing charged particle and neutron production and radiography.
- Proposal sponsor: M. Millot, LLNL, C. Kuranz, U Mich, M.Adams, SNL

27. Improve target process: from request to shot day

- Requirements:
 - PI brief and/or document with general information, POC, links for each specific task
 - Add options to flag complicated design/build to allow additional time
 - Centralize information:
 - Implement system where 4-step process pending tasks are updated (clearly state action items for each party).
 - Allow PI's to upload documents that can be accessed by TargetFab "in the lab".
 - Give PI's access to drawings, etc. to clarify and prioritize specs (3-pager is not enough!). A database of past drawings would be useful to optimize target definition
 - Transparency on workload assigned to each target type: PI's can prioritize/seek alternatives **early on** (before step I)
 - Clarify number of targets allowed per campaign, target type and/or mounting
 - Implement a Target user station at the LLE: research teams could mount "easier" targets (or remount when possible)
 - Clarify if/when targets can be inspected/remounted.
 - Powell scope: to inspect quality or simply to ID to-spec targets/prioritize? What constitutes "not-to-specs" for GA?
 - Allow sufficient time before "point of no return" and ensure resources are available for remediation
- Impact of requested capability:
 - Optimize total "to-spec" targets per campaign reducing TargetFab workload.
 - Potential for Target Fabrication training (and possible workload reduction)
- Proposal sponsor: UCSD (Pia Valdivia - mpvaldivialeiva@ucsd.edu) + MIT (Johan Frenje) + U. de Valladolid (Gabriel Perez-Callejo) + U. Michigan (Sallee Klein, Heath Lefevre, Carolyn Kuranz) + Eu-XFEL (Victorien Bouffetier) + Broad support from OLUG

Summary

F&R sessions led by Alison Saunders (LLNL) and Verena Geppert-Kleinrath (LANL)

- General {
 - 1. Increase user information accessibility
 - 2. An OMEGA MediaWiki and/or Q&A forum to crowdsource guides and reference materials
 - 3. PI training week - more in-depth information for running shots
 - 4. Access to Omega-60 through LaserNetUS
 - 5. Integration of pulsed power capabilities with Omega/Omega-EP & FLUX operations
- Beams {
 - 6. Display requested beams from min to max in SRF Omega 60
 - 7. 3rd driver on Omega-60
 - 8. Increase possible time delay between UV drive beams on OMEGA EP to >650 ns
 - 9. Add beam timing at long timing delays on EP
- overlap → {
 - 10. Better Omega EP short pulse reproducibility for improved x-ray backlighters
 - 11. Film digitization: improve 3-month lead time
 - 12. Interstrip timing for framing cameras on shot images and reports
- Diagnostics {
 - 13. Fiducial timing and dispersion information for time-resolved Thomson scattering on shot images and reports
 - 14. Additional TPIE or another diagnostic to resolve charged particle energy spectra from multiple angles
 - 15. Long LoS diagnostic port(s) on EP
 - 16. Add collimators to EP NTOFs
 - 17. Gate valve for NTD nosecone swapping
 - 18. Capability to infer directional flow vector on D2-gas-filled or low DT yield implosions
 - 19. Better colormap bounds on Shot Images and Reports
- overlap → {
 - 20. *OTS Diagnostics on EP*
 - 21. *nTOF detectors to measure secondary DT-neutron spectra*
 - 22. *An additional TPS, more (mini)TIMs, and/or NDIs, for OMEGA* } From FY22
- Targets {
 - 23. Front light the TVS views
 - 24. Improved target alignment capabilities for targets away from TCC
 - 25. MIFEDS Gen-3 implementation for very high initial B-fields
 - 26. Planar Cryo on EP
 - 27. Improve target process: from request to shot day

Last year's (2022) F&R's

2022: F&R sessions led by Maria Gatu Johnson (MIT) and Sean Finnegan (LANL)

- | | |
|-------------------|--|
| General | 1. Equipment for improved hybrid workshop execution |
| Documentation | 2. Ensure that users have access to detailed, and up to date documentation on diagnostics |
| Calibration | 3. Make calibration data readily available on PI portal |
| Diagnostics | 4. 3rd VISAR leg on ASBO at EP and/or OMEGA |
| | 5. Thicker VISAR etalon support for improved ASBO resolution |
| | 6. Add a timing fiducial to Dante, noted in Sustainment plan (requires modern digitizers) |
| | 7. Add OTS Diagnostic to EP (Multiple Submissions) |
| | 8. Capability to infer directional flow vector on D2-gas-filled or low DT yield implosions |
| | 9. Request for capability for nTOF detectors to measure secondary DT-neutron spectra |
| | 10. Reduce min/max camera timing jitter |
| | 11. Dante maintenance and documentation improvements |
| | 12. Ability to Run Streaked X-ray Diagnostics with Gas Jet |
| | 13. Gated SXS: gated spatially-resolved x-ray spectroscopy |
| Target capability | 14. Additional TPS, more (mini) TIMs and/or NDIs for OMEGA |
| | 15. Diagnostic for forward scattered light at OMEGA-EP |
| | 16. Characterization of Gas Jet Nozzles - TIM lab nozzle characterization test bench is now available to users |
| | 17. Planar Cryo on EP |
| Beams | 18. Ability to Change MIFEDS Leads on Shot Day |
| | 19. Increased UV power on EP |
| | 20. 20 ns pulse duration at EP |
| | 21. Increase the quantity of tight focus circular Super-Gaussian DPPs. |
| Data management | 22. Extended Backlighter Beam Delay |
| | 23. Update to HDF5 and Utilize Standard Meta-Data Formats (Multiple Submissions) |
| | 24. Enable instant analysis of data on shot day |
| | 25. Develop more open-source analysis software |

Plans are in place to address many of the 2022 OLUG (F&R's)

1. Equipment for improved hybrid workshop execution
2. Ensure that users have access to detailed and up-to-date documentation on diagnostics
3. Make calibration data readily available on PI portal
4. Third VISAR leg on ASBO on OMEGA EP and/or OMEGA
5. Thicker VISAR etalon support for improved ASBO resolution
6. Add timing fiducial to Dante, noted in Sustainment Plan (requires modern digitizers)
7. Add OTS Diagnostic to OMEGA EP (Multiple Submissions)
8. Capability to infer directional flow vector on D_2 -gas-filled or low-DT yield implosions
9. Request for capability for nTOF detectors to measure secondary DT-neutron spectra
10. Reduce min/max camera timing jitter
11. Dante maintenance and documentation improvements
12. Ability to run streaked x-ray diagnostics with gas jet
13. Gated SXS: gated spatially resolved x-ray spectroscopy

Green – complete

Orange – in progress

Red – deferred, lack of funding

Black – no update, or little progress

2022 OLUG F&R responses (continued)

14. Additional TPS, more (mini) TIM's and/or NDI's for OMEGA

15. Characterization of Gas Jet Nozzles

16. Planar Cryo on EP

17. Ability to change MIFEDS leads on shot day

18. Increased UV power on EP

19. 20-ns pulse duration on OMEGA EP

20. Increase the quantity of tight focus circular super-Gaussian DPP's

21. Extended backlighter beam delay

22. Update to HDF5 and utilize standard meta-data formats (multiple submissions)

23. Enable instant analysis of data on shot day

24. Develop more open-source analysis software

25. Diagnostic for forward-scattered light on OMEGA-EP

Green – complete

Orange – in progress

Red – deferred, lack of funding

Black – no update, or little progress

Student and Postdoc F&R's

Heath Lefevre (UM) led the young-researcher 2023 F&R session

- **Increasing OLUG attendance by students**

- NNSA travel support is crucial and contributes to accessibility.
- Workshop timing conflicts with exams/mid-terms, hindering student attendance.

- **Forming better connections leading to collaborations**

- Extend/re-shift workshop schedule. Facilitate interactions between junior and senior scientists (including LLE staff).

*It was noted that advice and ideas stemming from conversations held at OLUG is valuable, even if no formal collaborations are established

- **Increasing Tutorial session effectiveness and accessibility**

- Tutorials with hands-on component are highly desired (e.g., run a FLASH simulation, put together a target in VISRAD, process experimental/synthetic diagnostic data).
- Timing restrictions are a concern as well as co-timing with community-building activities supporting URM's.

*Multiple (recorded) Zoom tutorials through the year would increase accessibility and topics covered within the life-time of PhD program, for example.

- **Improving training and support for young scientists**

- Virtual sessions are not as effective as in-person training. Re-assessment needed. In-person training a few days before/after OLUG was suggested
- Radiation (week-long) safety training timing is not convenient. Additional sessions requested throughout the year

- **Develop better framework for mentorship and guidance for early career scientists**
 1. Facilitate cross-institution mentorship, matching up new researchers doing work at Omega with more experienced mentors.
 2. Formation of something like a journal club for topics related to experimental planning and analysis (monthly or bi-weekly, with a pre-meeting poll on the discussion topic).
- **Improve and modernize the web-based resources available to users**
 1. Continue to improve documentation for diagnostic systems and targetry.
 2. Better advertise for the existing online forum, a Microsoft Teams channel (or similar) specifically for users to ask questions of other users.
 3. Record tutorials for some of the online resources for data access.
 4. Enable access to calibration information for diagnostics via an online database.