Documentation

(1) Ensure that users have access to detailed, and up to date documentation on diagnostics

- Requested capability: Ensure that users have access to detailed, and up to date documentation on diagnostics.
- Capability requirements: Bring operating procedures and diagnostic info pages back online. Document TIM-Frame-CCD compatibility in spreadsheet. Document differences, advantages, disadvantages between XRFCs (e.g. radiation hardening, contrast, sensitivity).
- Impact of requested capability: Improve access to required information to analyze data, which will reduce turn around between experiment and use/publication over time. Ensure that most accurate and up to date info is available for data analysis and shot day preparation.
- Proposal sponsor: LANL
- Proposal support: MIT, LLE

Community comments: Request of particular cases is (e.g. frame compatibility; details of inter-strip timing, gates, etc. for XRFC) are useful. While operational procedures may have some utility, diagnostic user guides will be the most useful for PIs. LLE has a library of presentations that can be made available (Steven Ivancic)

Submitter: Pawel Kozlowski

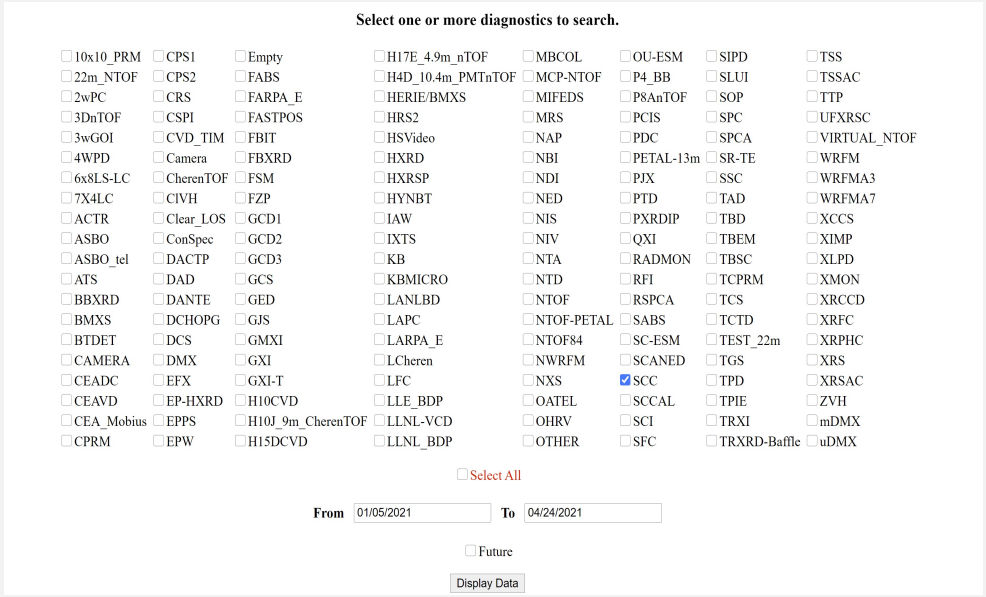
(2) Improved Navigation on the Diagnostic Usage Page

- Requested capability: IT support to improve the navigation from the Diagnostic Usage Page
- Capability requirements: Sometimes PI explore how a certain diagnostics has been used in the past. Currently the process for finding usage days and looking at corresponding RIDs is very taxing.
- Impact of requested capability: Quality of life improvement to the OMEGA Ops website
- Proposal sponsor: P J Adrian (pjadrian@mit.edu)
- Proposal support: M. Bailly-Grandvaux (UCSD), S. Zhang (PPPL)

Submitter: Maria Gatu Johnson

(2) Add links to the shot days for easier navigation to RIDs with diagnostic setups

Diagnostic Usage Page



Select one or more diagnostics to search.

10x10_PRM	CPS1	Empty	H17E_4.9m_nTOF	MBCOL	OU-ESM	SIPD	TSS
22m_NTOF	CPS2	FABS	H4D_10.4m_PMTnTOF	MCP-NTOF	P4_BB	SLUI	TSSAC
2wPC	CRS	FARPA_E	HERIE/BMXS	MIFEDS	P8AnTOF	SOP	TTP
3DnTOF	CSPI	FASTPOS	HRS2	MRS	PCIS	SPC	UFXRSC
3wGOI	CVD_TIM	FBIT	HSVideo	NAP	PDC	SPCA	VIRTUAL_NTOF
4WPD	Camera	FBXRD	HXRD	NBI	PETAL-13m	SR-TE	WRFM
6x8LS-LC	CherenTOF	FSM	HXRSP	NDI	PJX	SSC	WRFMA3
7X4LC	CIVH	FZP	HYNBT	NED	PTD	TAD	WRFMA7
ACTR	Clear_LOS	GCD1	IAW	NIS	PXRDIP	TBD	XCCS
ASBO	ConSpec	GCD2	IXTS	NIV	QXI	TBEM	XIMP
ASBO_tel	DACTP	GCD3	KB	NTA	RADMON	TBSC	XLPD
ATS	DAD	GCS	KBMICRO	NTD	RFI	TCPRM	XMON
BBXRD	DANTE	GED	LANLBD	NTOF	RSPCA	TCS	XRCCD
BMXS	DCHOPG	GJS	LAPC	NTOF-PETAL	SABS	TCTD	XRFC
BTDET	DCS	GMXI	LARPA_E	NTOF84	SC-ESM	TEST_22m	XRPHC
CAMERA	DMX	GXI	LCheren	NWRFM	SCANED	TGS	XRS
CEADC	EFX	GXI-T	LFC	NXS	SCC	TPD	XRSAC
CEAVD	EP-HXRD	H10CVD	LLE_BDP	OATEL	SCCAL	TPIE	ZVH
CEA_Mobius	EPPS	H10J_9m_CherenTOF	LLNL-VCD	OHRV	SCI	TRXI	mDMX
CPRM	EPW	H15DCVD	LLNL_BDP	OTHER	SFC	TRXRD-Baffle	uDMX

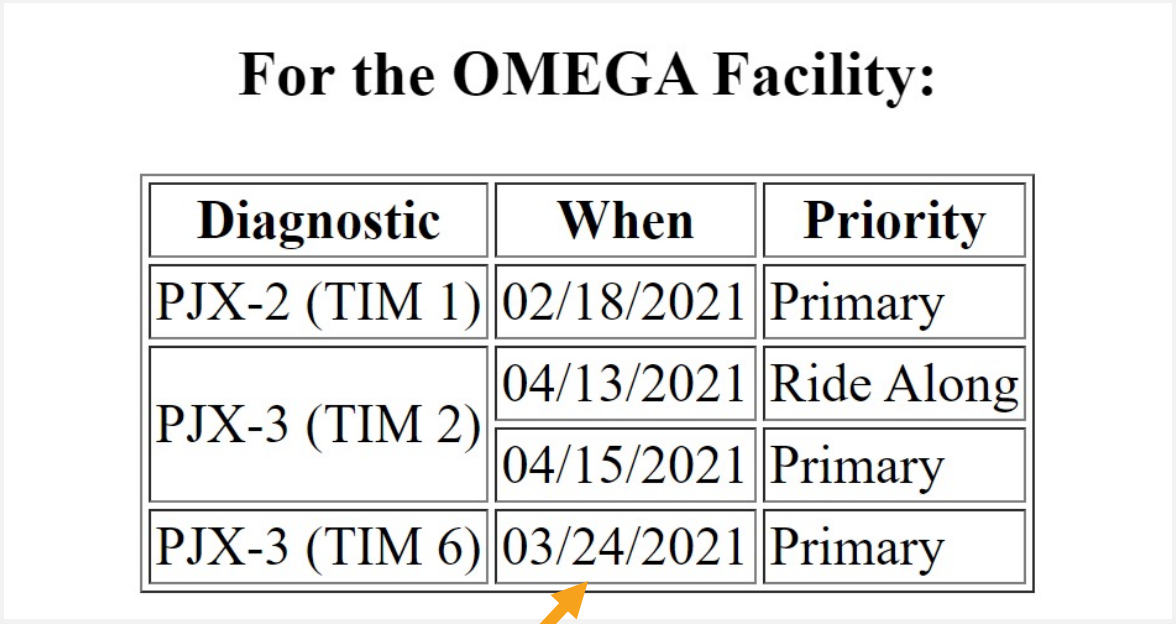
Select All

From 01/05/2021 To 04/24/2021

Future

Display Data

Current results page:



For the OMEGA Facility:

Diagnostic	When	Priority
PJX-2 (TIM 1)	02/18/2021	Primary
PJX-3 (TIM 2)	04/13/2021	Ride Along
	04/15/2021	Primary
PJX-3 (TIM 6)	03/24/2021	Primary

Add a link to a the shot day overview page or to a list of RIDs

(3) Make EP UV optics transmission measurements readily available to users

- Requested capability: EP UV optics transmission numbers should be made available to PI's both before and after their shots. The transmission values are measured every Friday, and are currently available upon request. However, they should be made more readily available to users.
- Capability requirements:
  - 1) Add UV optics transmission values to the administrative shot summary page, this should include values from both the Friday before and after.
  - 2) Make the transmission history plot available from the EP launchpad.
- Impact of requested capability: This will increase PI's knowledge of on shot laser energy. Energy reported and requested assumed a nominal 90% transmission value, whereas the transmission value varies between ~80-100% over time. This represents an uncertainty of +-10% between shot days. While the measured transmission values aren't exactly predictive of performance on any given shot, they still represent useful information.
- Proposal sponsor: Alexander Rasmus (LANL)
- Proposal support: M. Manuel (GA)

Submitter: Alex Rasmus

Calibration

(4) Dante maintenance and documentation improvements

Submitter: Pawel Kozlowski

- Requested capability: Dante maintenance and documentation improvements.
- Capability requirements: Mitigate damage to filters or increase replacement frequency (pinholes from debris strikes generate systematic errors in measurement). Catalog filters and include info in header file necessary for calculating response functions.
- Impact of requested capability: Multiple campaigns are using indirect drive platform to mitigate preheat. Precise Dante measurements are critical for characterizing drive and constraining simulations on these campaigns.
- Proposal sponsor: LANL;

Community comments: Discussion on LLE vs LLNL responsibilities. LLNL owns Dante equipment, DAQ, and provides calibrated filters (LLNL supply chain). Bob Heeter needs to be contacted.

(5) Make calibration data readily available on PI portal

Submitter: Pawel Kozlowski

- Requested capability: Make calibration data readily available on PI portal.
- Capability requirements: Keep a database of calibrations for each diagnostic maintained on PI portal. Make sure they have correct dates and are well documented with relevant metadata. For example, put all the Dante response functions up on PI portal.
- Impact of requested capability: Improve access to required information to analyze data, which will reduce turn around between experiment and use/publication over time. Ensure calibrations are applied correctly and consistently for demonstrably reproducible scientific analysis. Enable instant analysis of data on shot day.
- Proposal sponsor: LANL;
- Proposal support: K. Falk (HZDR)

Community comments: Particular cases are easier to address. Additional cases mentioned: OTS spectrometer calibration, spectral range, dispersion, spatial calibration; SOP full calibration sheets beyond the RSI papers. Provide a space for users to provide info to the facility/community; e.g. K. Falk can provide detailed info on the IXTS.

Submitter: Derek Schaeffer

(6) Characterization of Gas Jet Nozzles (updated)

- Requested capability: the gas jet system is quickly becoming a key component of many Omega experiments. While a basic theoretical understanding of gas jet performance has been demonstrated, there has been little direct characterization of the wide variety of currently available gas jet nozzles, especially at large nozzle diameters. This request suggests that LLE perform a standard set of measurements for commonly used gas jet nozzles and provide a procedure for PIs to request characterization of other and/or new nozzles.

- Capability requirements: measure gas density as a function of time and distance from the nozzle. Of particular interest would be the laminarity of the gas flow. Such characterization can now be carried out on the newly commissioned gas jet test stand. Additionally, sufficient measurements can likely be used to construct an accurate model of gas jet characteristics as a function of nozzle parameters, so that future nozzles can be created without explicit testing.
- Impact of requested capability: provides PIs with critical information about gas jet performance.

- Proposal sponsor: Princeton, PPPL
- Proposal support: UCSD, U Mich

Community comments: This is similar to a 2020 request and the new characterization station is coming online now. Specifics on which measurements are needed and how to disseminate information is still needed.

(7) Characterization of Standard Proton Source on EP (updated)

- Requested capability: EP now provides a standard proton source (proton tube) using a thin Cu foil. However, there is no published reference data on the performance of this source. The requests suggests that EP undertake and publish measurements of the proton beam and detector characteristics.
- Capability requirements:
  1. Measure and characterize proton energy spectra, proton beam cone angle (divergence), beam non-uniformities (in vacuum), and spatial resolution, both with and without the BL debris shield.
  2. ~~Incorporate scanned film into the shot report data tree~~ (completed)
  3. ~~Systematize scanning procedure and save film scanning parameters into data tree (similar to IP data)~~ (completed)
  4. Calibrate/characterize film scanning (similar to https://aip.scitation.org/doi/10.1063/1.4954921)
- Impact of requested capability: provides PIs with critical information about proton beam performance.
- Proposal sponsor: Princeton, PPPL
- Proposal support: K. Falk (HZDR)

Community comments: Discussion on what calibration requirements are for a given measurement. Proton beam may not be stable enough to get reference for proton radiography and performance differs depending on the configuration (e.g. debris shield). RCF is not consistent batch-to-batch and a slice of film would be needed to characterize exact sensitivity of each batch (assuming consistency within a batch). There is a big gap between doing radiography or determining a rough cut-off energy, and performing actual dosimetry in each layer.

Submitter: Derek Schaeffer

(8) Continue CPS 1, CPS 2, MagSPEC calibration with Ra-221 source

- Requested capability: Purchase Ra-221 source at 10 uCi activity. Design and build new holders for source for CPS1,2 and MagSPEC
- Capability requirements: We need to make a calibration system for charged particle spectrometers using higher energy particles. Ra-221 provides alphas from 4-7 MeV.
- Impact of requested capability: Calibration of the higher energy fingers of CPS 1 and 2 in an offline calibration run. Impacts all users who rely upon charged particle spectroscopy
- Proposal sponsor: P J Adrian (pjadrian@mit.edu) .

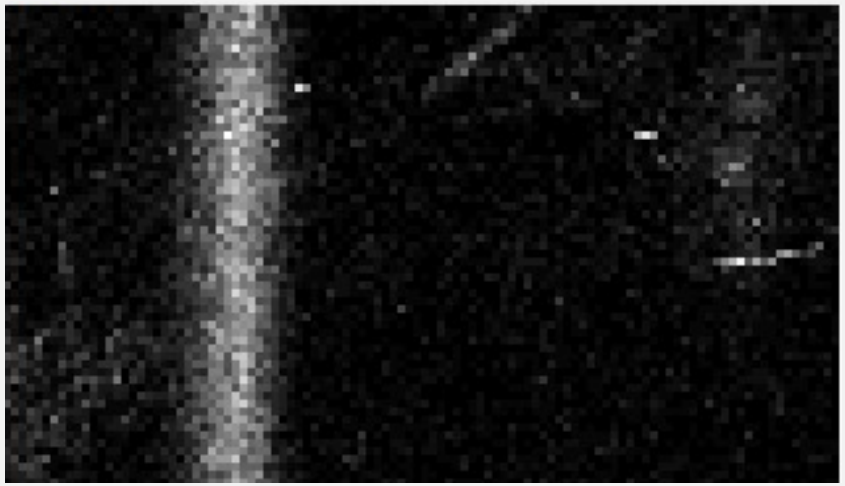
Community comments: The hardware exists, but the requested new source may need alteration to present hardware.

Submitter: Maria Gatu Johnson

(8) We have demonstrated a Charged Particle Calibration Platform using Am-241 source that produces alphas for the lower energy windows, we need Ra-221 for high energy windows

CPS 1

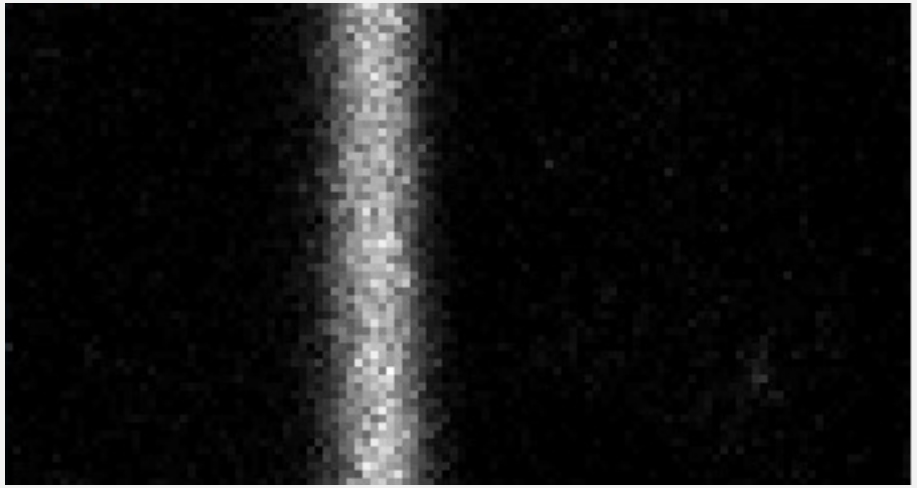
<E> = 4.40 MeV



Energy Axis

CPS 2

<E> = 4.45 MeV



Energy Axis

(9) Bragg crystal inventory and characterization for SXS

- Requested capability: the inventory of Bragg crystals for SXS is aging. It would be important to carefully characterize current crystals (photon energy range, reflectivity, defects) and decide on replacements and additional crystal choices.

- Capability requirements: replace and purchase new Bragg crystals for SXS.

- Impact of requested capability: all OMEGA and OMEGA EP users doing x-ray spectroscopy with SXS x-ray spectrometers will benefit from several options in photocathode selection.

- Proposal sponsor: Roberto Mancini, UNR
- Proposal support: UCSD, MIT

Community comments: Request is for both documentation and characterization.

Submitter: Roberto Mancini

Diagnostics

(10) Add a timing fiducial to Dante

Submitter: Pawel Kozlowski

- Requested capability: Add a timing fiducial to Dante
- Capability requirements: Relate Dante oscilloscope timings to Omega-60 facility time.
- Impact of requested capability: Multiple campaigns are using indirect drive platforms, with measurements which require precise Dante data. Currently, Dante signals are aligned in an ad-hoc manner (align to peak signal on each channel) to enable spectral and radiation temperature unfolds. Such ad-hoc alignments are not possible when multiple radiation sources are observed by Dante (e.g. hohlraum, and backlighters), and recent work has shown that misaligning by as little as ~70 ps in time can pose significant issues to successfully unfolding spectra (https://doi.org/10.1063/5.0002856).
- Proposal sponsor: LANL;

Community comments: Discussion on LLE vs LLNL responsibilities. LLNL owns Dante equipment. Bob Heeter needs to be contacted.

(11) Fix SSCA UV timing fiducial

Submitter: Heather Johns

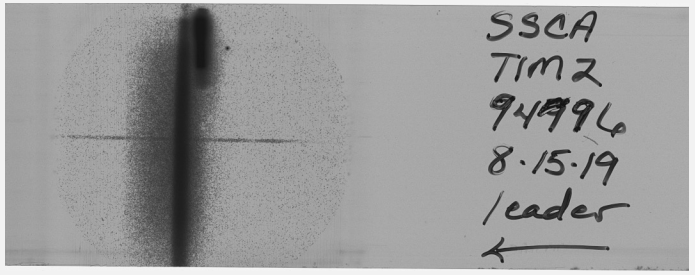
- SSCA is supposed to come with a UV timing fiducial but it performs highly unreliably in some TIMs (TIM2 being one of them).
- A dedicated update to this capability would make use of the streak camera much more straightforward and assist significantly in data analysis.
- In the last couple of years this has gone from 'reliably there' to 'reliably absent' on some TIMs. The goal should be to assess the cause of the unreliability, update the hardware, and ameliorate this issue.

- Proposal sponsor: LANL;
- Proposal support: M. Bailly-Grandvaux (UCSD)

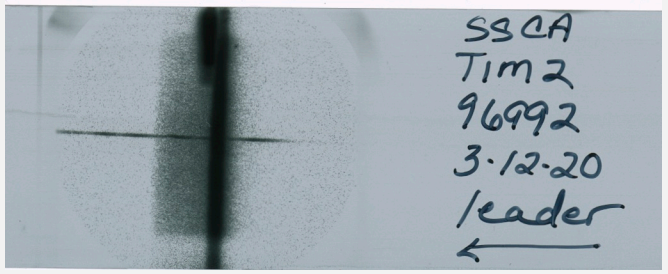
Community comments: LLE acknowledges the issue and suggests bringing up the need for the UV fiducial early (proposal stage) so the facility can allocate resources to fix fibers. Other interest in reliability in crystal positions and orientation.

(11) Example of needed fix to SSCA UV timing fiducial

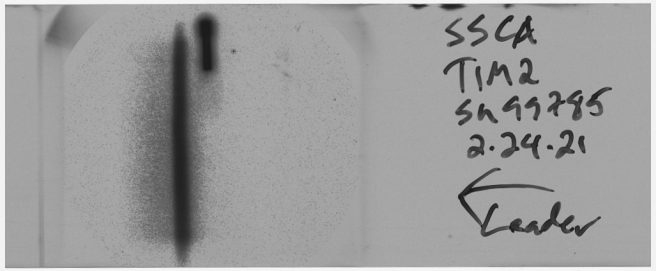
Example: Radishock 19C (8/15/2019): Every single shot featured the timing fiducial. There were no issues. This was typical for preceding Radishock shot days as well.



Example: Radishock 20A (3/12/2020): 3 last shots featured UV timing fiducial. Took many repair attempts across the day.



Example: OUTI21A (2/24/2021): No shots successfully featured UV timing fiducial despite multiple attempts to repair.



- Setup for the SSCA diagnostic across this time was largely unchanged. (RID 81491 for OUTI21A shot 99773 is entirely typical).

(12) ASBO/SOP on EP TIM 14

Camelia V Stan (LLNL), Hye-Sook Park (LLNL), Matt Hill (AWE)

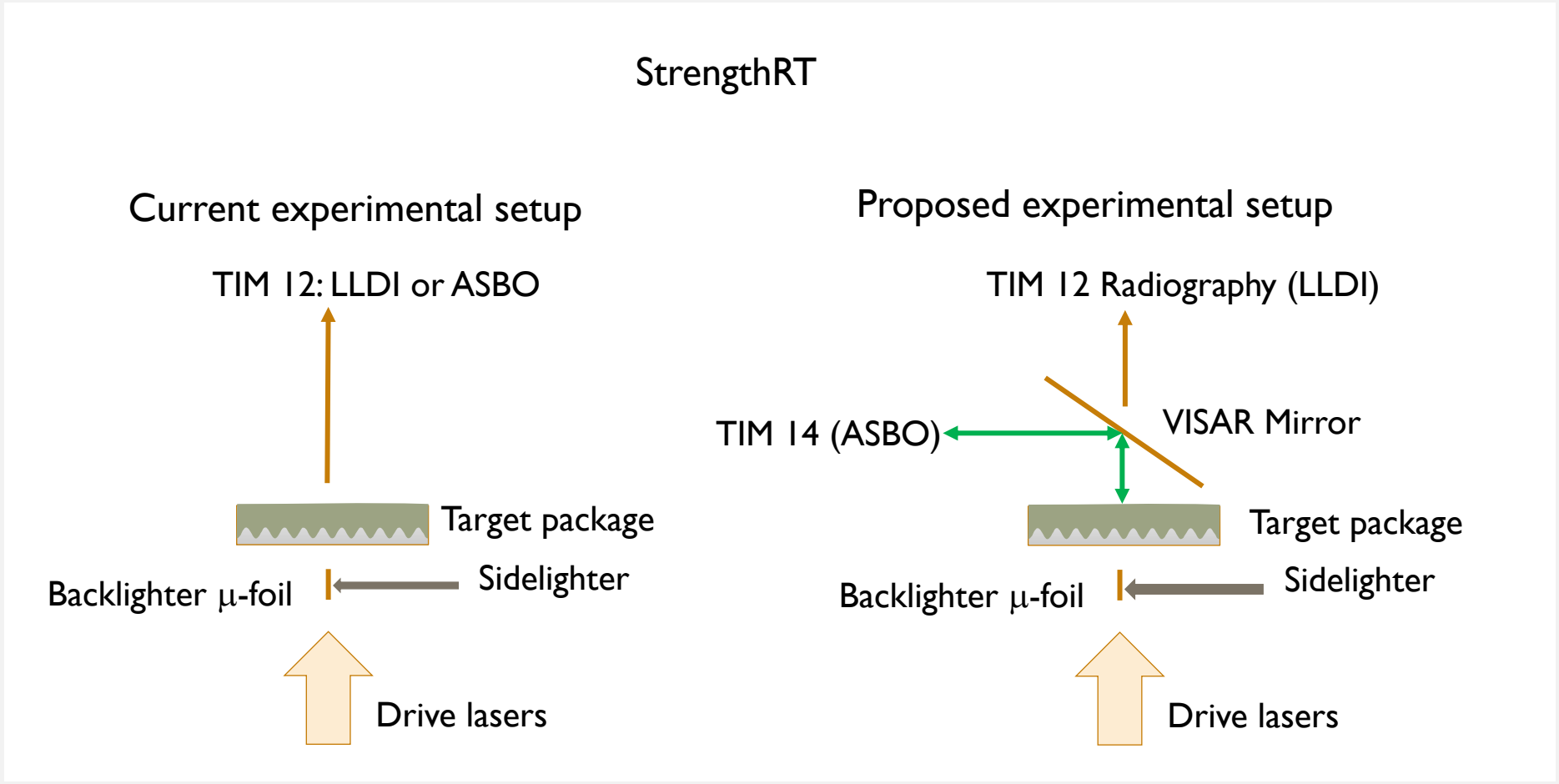
Submitter: Camelia Stan

- We would like ASBO/SOP to be available on TIM 14 to enable simultaneous VISAR on TIM14 and radiography and/or other diagnostics on TIM12
- ASBO/SOP on TIM 14 should have the same performance to the current ASBO/SOP setup on TIM 12.
- This would allow simultaneous ASBO/SOP measurements with other diagnostics mounted on TIM 14. For the strength campaigns (TinRT, DDRT, future LLNL StrengthRT campaigns), it will allow simultaneous laser drive/radiography measurements. For HeatEOS, it would enable more natural target geometries without needing the use of a difficult mirror.
- Proposal sponsor: C. Stan (LLNL), H.-S. Park (LLNL), Matt Hill (AWE)
- Proposal support: Jiang Sheng (LLNL), Yuan Ping (LLNL), and Gaia Righi (UCSD, LaserNetUS), LANL

Community comments: Perennial request from LLNL. This can be used on many campaigns. Possible issues with mirror placement and unconverted light. Similar issues with ASBO. On TIM 6 were fixed with proper shielding.

(12) ASBO/SOP on EP TIM 14

Camelia V Stan (LLNL), Hye-Sook Park (LLNL), Matt Hill (AWE)



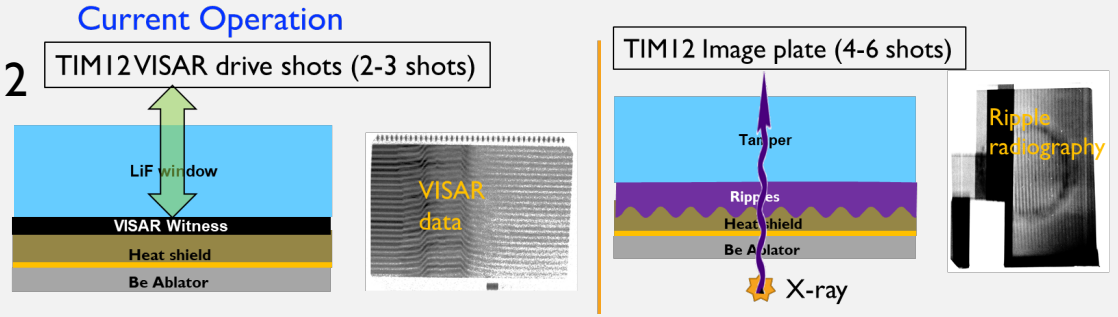
(12) ASBO/SOP on EP TIM 14

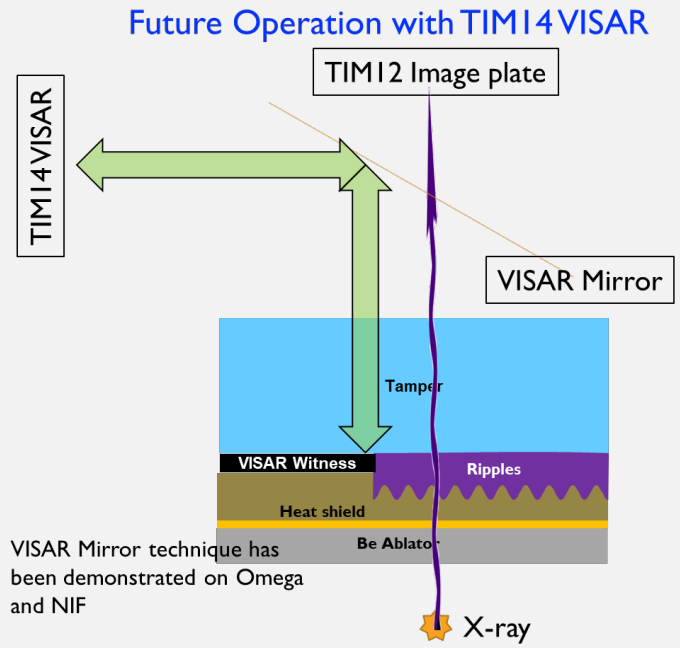
Camelia V Stan (LLNL), Hye-Sook Park (LLNL), Matt Hill (AWE)

- This setup would enable the ASBO to measure velocimetry simultaneously while other diagnostics such as LLDI are mounted in TIM 12.
- In the case of our experiments (direct-drive Rayleigh-Taylor strength measurement), we currently dedicate separate shot to measure laser drive parameters to understand physics pressure profile on our target sample. The lasers are stitched to form a ~27-30 ns ramped pulse shape that directly drives the sample. Variations in the laser pulse shape from shot to shot mean that the pressure/temperature condition in the experimental data shots is only approximately known at best. In some cases, slight stitching errors lead to additional shocks being introduced into the sample, which are undesirable and obfuscate data interpretation.
- If ASBO were installed on TIM 14, we would be able to acquire both radiography and drive with the addition of a VISAR mirror for the ASBO laser and deconvolute shot-to-shot variations in the laser pulse shape delivering the best physical results.
- This would enable many other experimental geometries that would be beneficial to other groups as well. For example, the HeatEOS experimental platform PI Sheng Jiang has expressed support for this configuration as well, as it would enable their SOP measurements without their having to do complicated modifications to their experimental setup, as is the present case.

[Ref. 2019 Submission] Allow VISAR/SOP capability on TIM14 (EP)

- Requested capability: VISAR/SOP capability on TIM14 on Omega-EP
- Capability requirements: The same capability as on TIM12 VISAR/SOP: 2 VISAR legs, the same streak cameras, the same sweep speed choices and the SOP.
- Impact of requested capability:
  - Doubles data acquisition rate on Strength campaign RT ripple growth experiments
    - Current configuration limited to alternating VISAR and radiography on same TIM'; TIM12 is the only station capable of both ripple radiography and VISAR
      - Drive shots on first 2-3 shots using TIM12 VISAR and switch to a radiography diagnostic on TIM12
      - Adds uncertainty in understanding of the drive since shot-to-shot laser variations and target variations exist
- Proposal sponsor: Benefit to the HED materials campaigns. Programmatic POC: Jim McNaney (LLNL); Technical POC: Hye-Sook Park (LLNL), similar LANL interest





(13) Add OTS Diagnostic to EP (updated)

Submitter: Derek Schaeffer

- 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: Princeton, PPPL

- Proposal support: K. Falk (HZDR), M. Manuel (GA), S. Zhang (PPPL), M. Bailly-Grandvaux (UCSD), S. Malko (PPPL), C. Walsh (LLNL)

Community comments: Similar request to previous years. Specific configuration and experiment requests would help scope the work. A potential compromise may be a TIM-based spectrometer near 3w (or 1w) so that a main beam could be used.

(14) More Streak Camera Options for time-resolved x-ray spectroscopy

- Requested capability: Currently there is only SSCA and PJX capable of mounting a SXS front end. SSCA is the only reliable camera for time-resolved x-ray spectroscopy. We want another camera for this kind of measurement.
- Capability requirements: Often experiments utilize dopants to produce line spectra which are used to probe plasma density and temperature. Time resolved measurements of line spectra offer a power diagnostic to understand and experiment's time evolution.
- Impact of requested capability: Having two streak cameras allows to probe in different x-ray energy bands, which is critical to measure K-shell and L-shell emission of high Z dopants.
- Proposal sponsor: P. J. Adrian (pjadrian@mit.edu),
- Proposal support: R. Mancini (UNR), E. Gallardo Diaz (UNR), M. Bailly-Grandvaux (UCSD)

Submitter: Maria Gatu Johnson

(15) Upgraded finger holders for CPS 1 and 2

Submitter: Maria Gatu Johnson

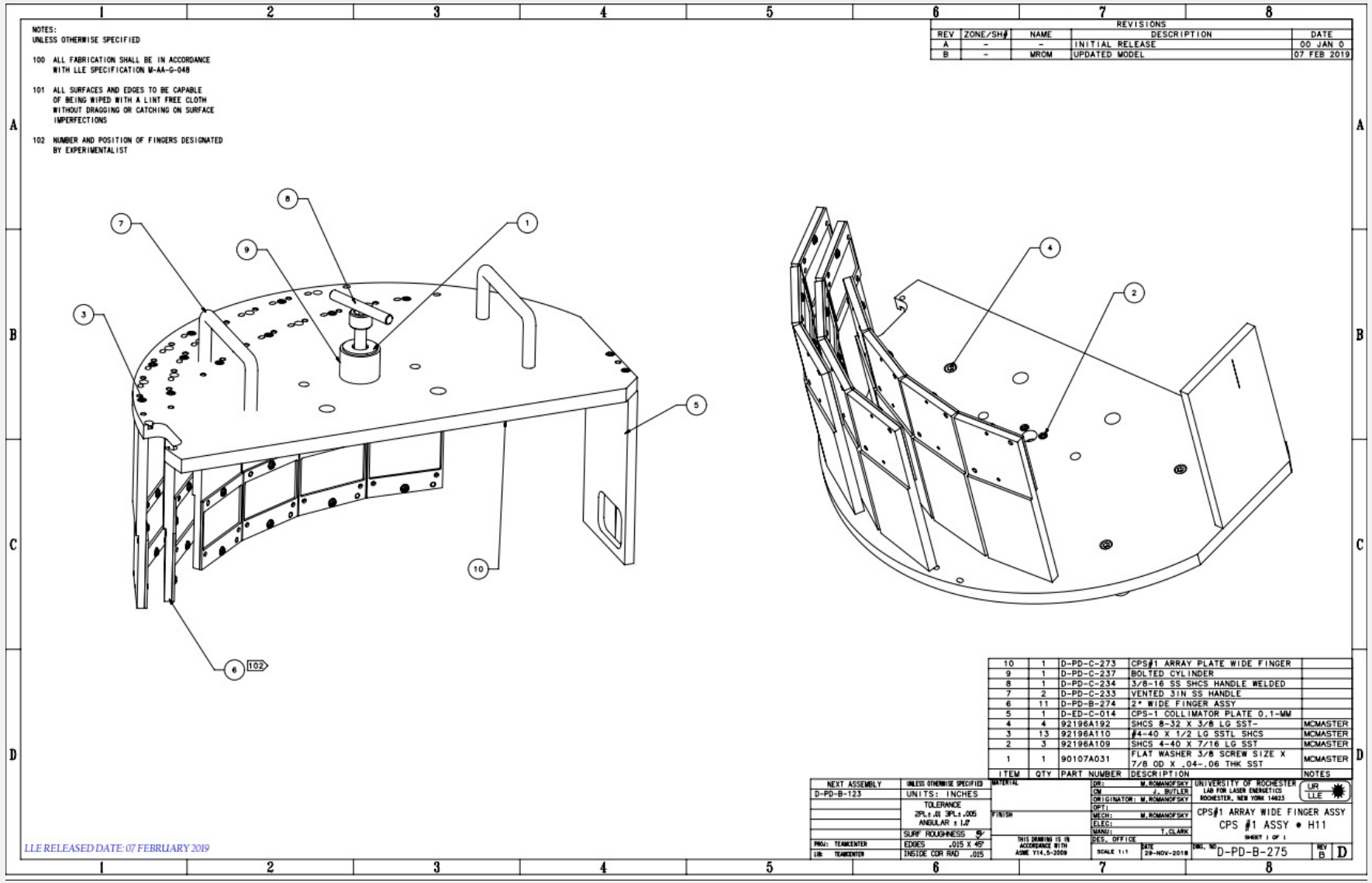
- Requested capability: Hardware upgrade to improve the positioning of the placement of CR39 in CPS 1 and 2.

- Capability requirements: Redesign of the filter holder to eliminate rotational variability of the CPS fingers.

Community comments: Hardware is designed, but manufacture hasn't been a priority yet.

- Impact of requested capability: Improvement in the fielding and calibration of CPS 1 and 2. This upgrade improves the measurement of Knock-on-deuterons (0-12 MeV) which is used by OMEGA Cryo program to infer rhoR.
- Proposal sponsor: J. Kunimune (kunimune@mit.edu), P J Adrian (pjadrian@mit.edu)
- Proposal support: H. Rinderknecht (LLE), V. Gopalaswamy (LLE), A. Crilly (IMP), B. Appelbe (IMP), O. Mannion (LLE)

(15) Upgraded finger holders have been designed in 2018 and just need to be manufactured



NOTES:
UNLESS OTHERWISE SPECIFIED

100 ALL FABRICATION SHALL BE IN ACCORDANCE WITH LLE SPECIFICATION M-AA-G-048

101 ALL SURFACES AND EDGES TO BE CAPABLE OF BEING WIPED WITH A LINT FREE CLOTH WITHOUT DRAGGING OR CATCHING ON SURFACE IMPERFECTIONS

102 NUMBER AND POSITION OF FINGERS DESIGNATED BY EXPERIMENTALIST

REVISIONS				
REV	ZONE/SH#	NAME	DESCRIPTION	DATE
A	-	-	INITIAL RELEASE	00 JAN 0
B	-	MROM	UPDATED MODEL	07 FEB 2019

ITEM	QTY	PART NUMBER	DESCRIPTION	NOTES
10	1	D-PD-C-273	CPS#1 ARRAY PLATE WIDE FINGER	
9	1	D-PD-C-237	BOLTED CYLINDER	
8	1	D-PD-C-234	3/8-16 SS SHCS HANDLE WELDED	
7	2	D-PD-C-233	VENTED 3IN SS HANDLE	
6	11	D-PD-B-274	2" WIDE FINGER ASSY	
5	1	D-ED-C-014	CPS-1 COLLIMATOR PLATE 0.1-MM	
4	4	92196A192	SHCS 8-32 X 3/8 LG SST-	MCMASTER
3	13	92196A110	#4-40 X 1/2 LG SSTL SHCS	MCMASTER
2	3	92196A109	SHCS 4-40 X 7/16 LG SST	MCMASTER
1	1	90107A031	FLAT WASHER 3/8 SCREW SIZE X 7/8 OD X .04-.06 THK SST	MCMASTER

NEXT ASSEMBLY: D-PD-B-123
UNLESS OTHERWISE SPECIFIED: UNITS: INCHES; TOLERANCE 2PL± .01 3PL± .005 ANGULAR ± 1.0°; SURF ROUGHNESS 63; EDGES .015 X 45°; INSIDE COR RAD .015
MATERIAL
FINISH
THIS DRAWING IS IN ACCORDANCE WITH ASME Y14.5-2009
DR: M.ROMANOFSKY
CH: J. BUTLER
ORIGINATOR: M.ROMANOFSKY
OPT:
MECH: M.ROMANOFSKY
ELEC:
MANU: T.CLARK
DES. OFFICE
SCALE 1:1
DATE 29-NOV-2018
UNIVERSITY OF ROCHESTER LAB FOR LASER ENERGETICS ROCHESTER, NEW YORK 14623
UR LLE
CPS#1 ARRAY WIDE FINGER ASSY
CPS #1 ASSY • H11
SHEET 1 OF 1
DWG. NO D-PD-B-275
REV B D
PROJ: TEAMCENTER
LIB: TEAMCENTER

LLE RELEASED DATE: 07 FEBRUARY 2019

(16) Time resolved x-ray history measurements in high neutron yield environments

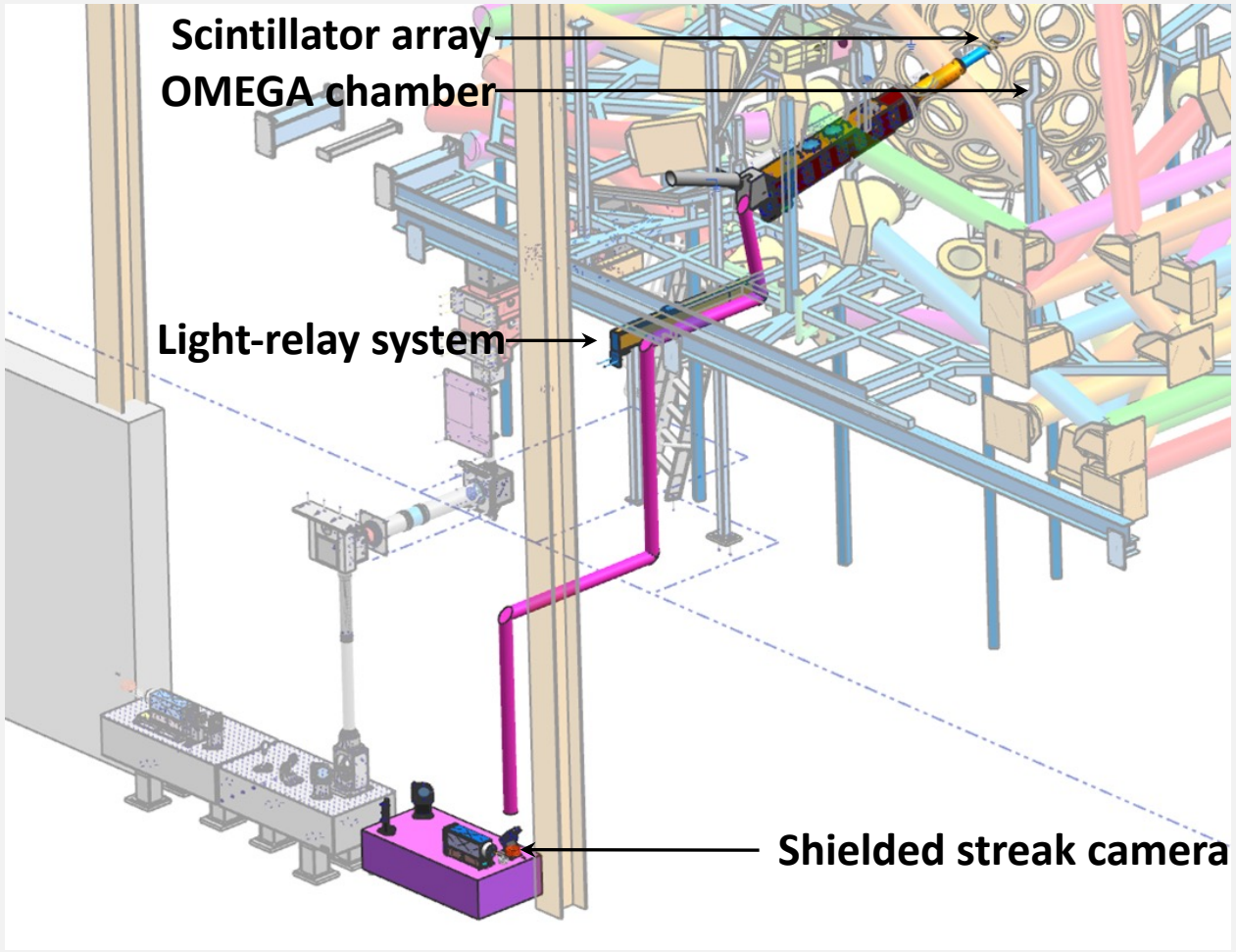
- Requested capability: dedicated system for making x-ray histories in multiple energy bands subject to high neutron yield environments
- Capability requirements:
  1. New light relay connection TIM5 to streak camera
  2. Facility resources to construct the system
  3. Ross Stream Camera (acquired OLUG FNR 2018)
- Impact of requested capability:
  - Enables time resolved electron temperature measurements
  - NIF has the SPIDER diagnostic for x-ray history; a system at OMEGA would enable direct comparison between similar experiments
- Proposal sponsor: P J Adrian (pjadrian@mit.edu)
- Proposal support: N. Kabadi, J. Frenje (MIT); R. Betti (LLE);

Submitter: Maria Gatu Johnson

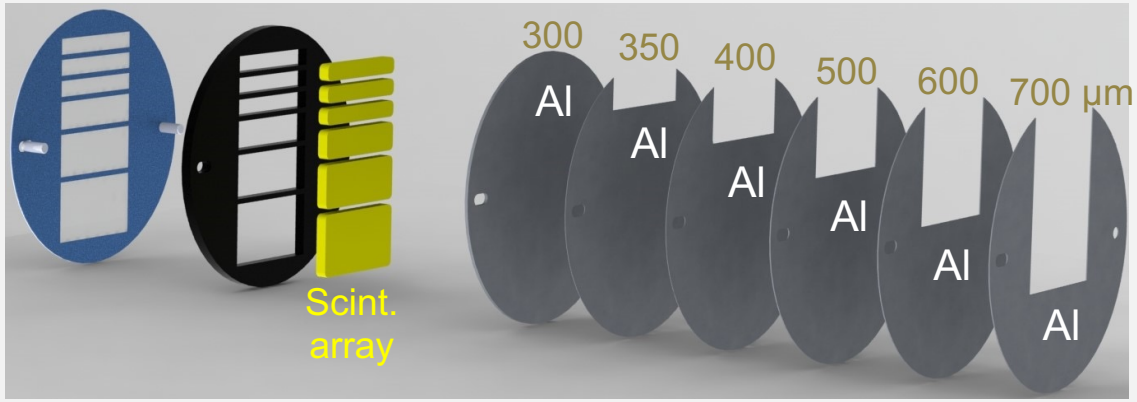
Community comments: Design is done, camera purchased, requesting final stages of installation. Modified NTD snout does not provide sufficient dynamic range to be widely applicable for x-ray measurements.

(16) Extensive work has been done designing the light relay system to have a temporal dispersion of ~ 20 ps

PXTD in the OMEGA target bay*



PXTD front end

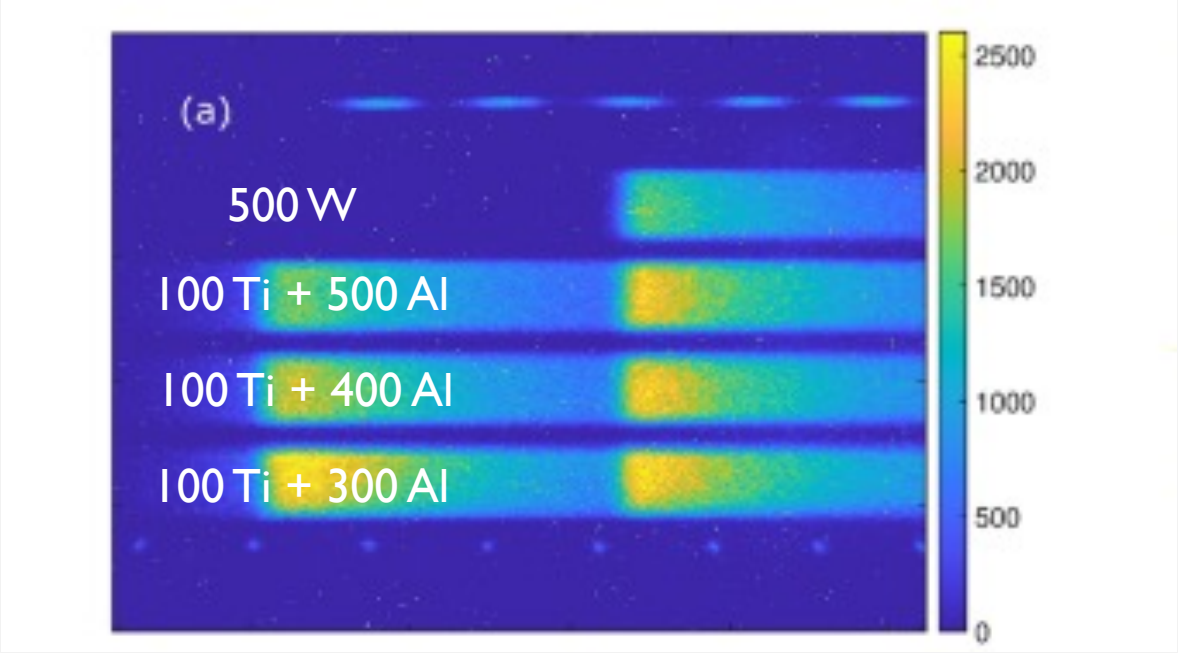


Time resolution*

	w bandpass	w/o bandpass
Chromatic disp.	~10 ps	~30 ps
Scint. response	<15 ps	
Streak camera	~10 ps	
Total (FWHM)	~20 ps	~35 ps

* D. Wiener for optical design and M. Bedzyk for Mech engineering

(16) Testing of a comparable system has been published, N. Kabadi *et al.* Rev. Sci. Instrum. 92, 023507 (2021), validating the design



Time Axis

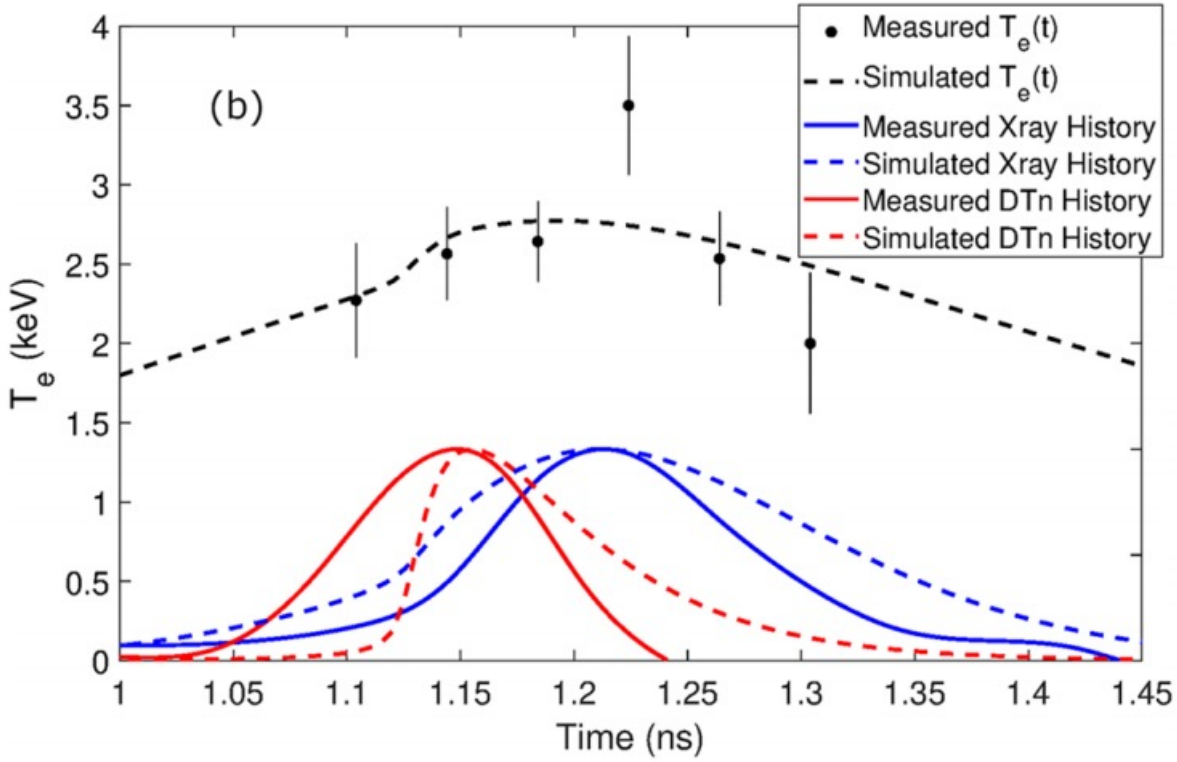
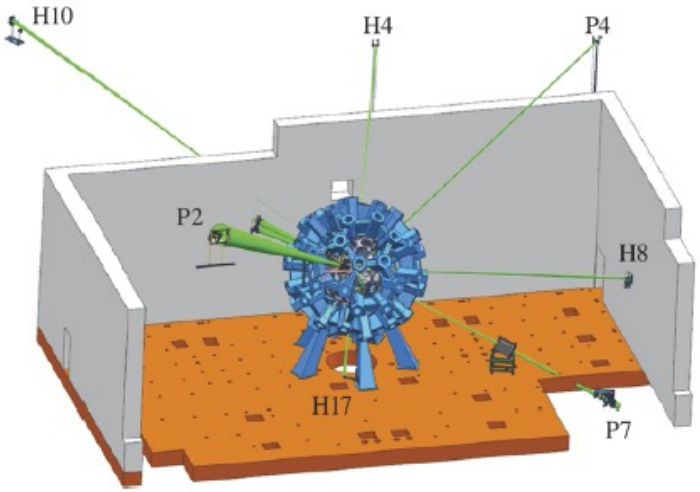


FIG. 6. (a) Raw streak image collected on OMEGA shock driven DT-filled implosion 98811. (b) The result of analyzing the data shown in Fig. 6(a) for T_e(t) is shown as black points. The deconvolved x-ray and DTn emission histories are shown as solid curves. T_e(t), x-ray emission, and DTn emission histories from a HYADES hydrodynamic simulation are shown as dashed curves.

(17) Capability to infer directional flow vector on D_2-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)*)

Community comments: Current low-yield sensitive nTOFs are not absolutely timed or appropriately shielded, new detectors needed. The request is for the DD flow vector in D2 (not DT) implosions or the DT flow vector in low-yield DT.



- 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)
- 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 (gatu@psfc.mit.edu)

Submitter: Maria Gatu Johnson

(18) 3rd VISAR leg

Submitter: Marius Millot

- Requested capability: 3rd VISAR leg on ASBO at EP and/or Omega
- Capability requirements: adding a 3rd leg to the ASBO systems.
- Impact of requested capability: Improve the velocity dynamic range and sensitivity by 2.5, improve relative timing accuracy by 2x, increase system reliability (redundancy)
- Proposal sponsor: M. Millot (LLNL) - all ASBO users would benefit from this upgrade
- Proposal support: S. Ali (LLNL)

Community comments: Perennial request. Follows expansion of the VISAR capability on the NIF. C. Stan agrees that 3rd leg is priority over new line of sight since it impacts all VISAR experiments.

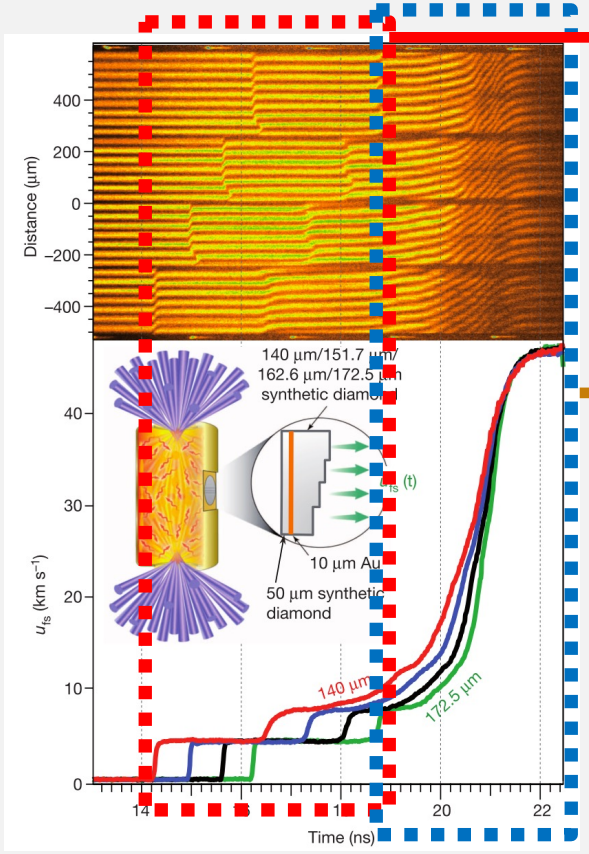
(18) We can extend the velocity dynamic range by adding more interferometer legs

- With two interferometers the number of velocity resolution elements is **250**:
  - Velocity resolution is $\delta v \approx$ (0.05 fringe) x VPF_{min} (*)
  - VPF chosen so that minimum velocity ≈ 3-5 fringes x VPF_{min}, maximum velocity ≈ 2.5 x 5 x VPF_{min} ≈ 12.5 fringes x VPF_{min}
  - Number of velocity resolution elements: $N_{<\delta v>} \approx 12.5/0.05 \approx$ **250**
- With additional interferometers we can extend this:
  - Adding 3rd leg: $N_{<\delta v>} \approx 250 \times 2.5 \approx$ **625**
  - Adding 4th leg $N_{<\delta v>} \approx 625 \times 2.5 \approx$ **1563**

*VPF_{min} is the sensitivity of the most sensitive interferometer

With 4 interferometer legs, the number of resolution elements for the 1D VISAR is multiplied by 6

(18) Additional 1D VISAR legs also allow more flexibility to improve the relative timing accuracy by 3x – 4x



- Most experiments strike a compromise between sweep window and time resolution
- Example of improved data return for ramp compression:
  - Use 2 legs to measure early time with longer sweep, low VPF (thick etalons): **high precision in the early part of the ramp**
  - Use other 1 or 2 legs to measure high acceleration with faster sweep, intermediate VPF: **high time resolution for the faster events**

(19) Additional photocathode options for PJX2 and PJX3

- Requested capability: only KBr photocathodes are currently available in PJX2 and PJX3. Characteristic K-edge structure of KBr can interfere with spectroscopy observations. It would be useful to have additional photocathode options for these streak cameras.

- Capability requirements: equip PJX2 and PJX3 with CsI and Au photocathode options similar to those available in SSCA.

- Impact of requested capability: all OMEGA and OMEGA EP users doing x-ray spectroscopy with the streaked spectrometers PJX2/SXS and PJX3/SXS will benefit from several options in photocathode selection.

Community comments: Specific and limited scope. The request is for different photocathodes on the SSCA, similar to what is available on PJXs.

- Proposal sponsor: Roberto Mancini, UNR
- Proposal support: MIT, K. Flippo (LANL), H. LeFevre (Umich)

Submitter: Roberto Mancini

(20) Accuracy of SSCA data acquisition time

Submitter: Roberto Mancini

- Requested capability: improve the accuracy of the algorithm and method that extracts the acquisition time information from SSCA's voltage plot. This information is critical for time-resolved measurements with the streak camera SSCA.

- Capability requirements: timing values provided to PI on SSCA timing sheet do not always reflect the actual acquisition time of the streak camera. They should be as accurate as possible. Otherwise, it can result in incorrect timing changes and loss of data.

- Impact of requested capability: all OMEGA and OMEGA EP experiments using SSCA will benefit from knowledge of accurate acquisition time.

Community comments: Addressing a known issue with SSCA. Current problems can easily result in data loss. J. Armstrong believes he can come up with a more precise (some fraction of the sweep window accuracy) analysis.

- Proposal sponsor: Roberto Mancini (UNR)
- Proposal support: H. LeFevre (UMich), M. Bailly-Grandvaux (UCSD), C McGuffey (GA), MIT

(21) Development of a new sector-magnet electron-positron-proton spectrometer (SMEPPS) diagnostic for use in a wide-range of HEDS experiments at the OMEGA and OMEGA EP laser facilities

Submitter: Charles Arrowsmith

Development of a new sector-magnet electron-positron-proton spectrometer (SMEPPS) diagnostic for use in a wide-range of HEDS experiments at the OMEGA and OMEGA EP laser facilities

Motivation: Analyses of recent experiments at OMEGA EP employing the electron-positron-proton spectrometer (EPPS) have indicated that significant background signal can arise from the generation of cascades of bremsstrahlung and secondary particles within the high-Z spectrometer shielding. In particular, this has presented challenges for experiments aiming to measure the energy spectra of electron-positron pairs generated via converter targets, and in the characterization of betatron x-ray sources.

Aim: To develop a complementary TIM-based particle spectrometer to EPPS that utilizes focusing magnetic sector fields to refocus diverging charged beams onto image plates (Sector-Magnet-EPPS). The design we present exhibits features that are expected to appeal to a wide range of experiments at OMEGA and OMEGA EP.

Impact: Currently EPPS is used on numerous shot days during the OMEGA and OMEGA EP calendar, representing tens to hundreds of shots over the year. We present a flexible design, which simulations suggest can provide increased resolution and solid-angle collection for users who wish to field electron, positron or proton spectrometry, or measure x-ray generation.

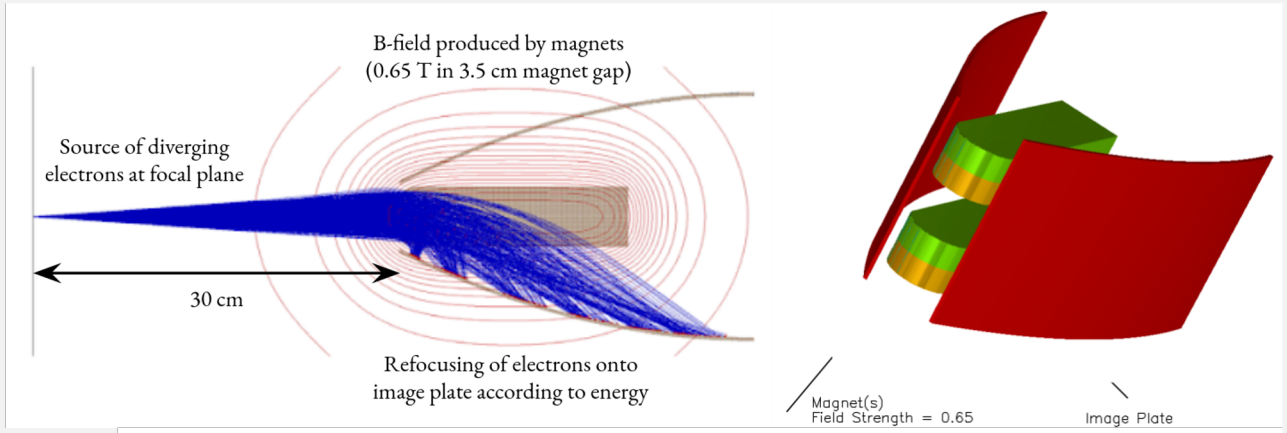
Proposal sponsor: C. Arrowsmith (Oxford)
Proposal support: H. Chen (LLNL), L. Willingale (Umich), Princeton/PPPL

Community comments: Request is for the facility to lead/build the diagnostic with LLNL/Oxford support. New design would reduce background relative to OUESM; useful for many users.

(21) Development of a new sector-magnet electron-positron-proton spectrometer (SMEPPS) diagnostic for use in a wide-range of HEDS experiments at the OMEGA and OMEGA EP laser facilities

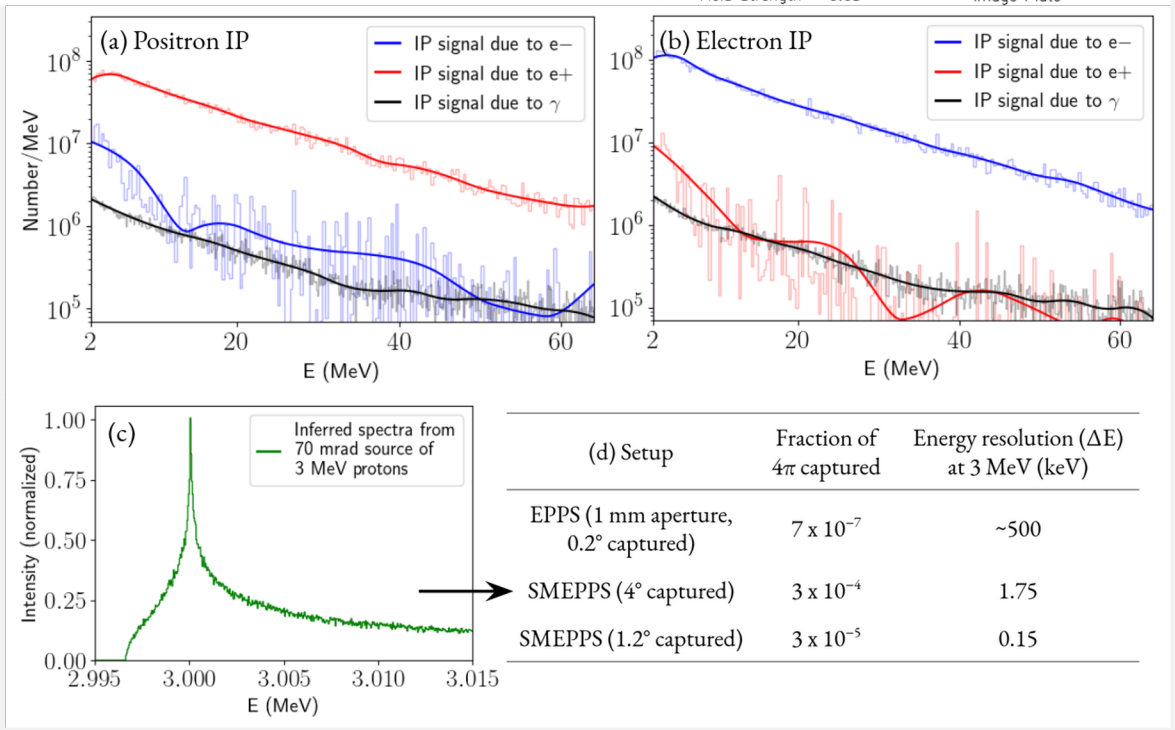
Design:

The sector-magnet acts on a diverging particle beam originating from a focal plane, and refocuses it onto an image plate position that is dependent on the particle energy. The spectrometer has a large acceptance angle (8° in the current design) so that a large solid angles can be captured, while reasonable energy resolution is maintained.



Possible applications (investigated with simulations):

1. Positron spectra with low-background (Figs. a, b)
2. High-resolution, high flux proton spectra (Figs. c, d)
3. Low-background characterization of x-ray sources
4. Measurement of particle spectra up to high energies



(d) Setup	Fraction of 4π captured	Energy resolution (ΔE) at 3 MeV (keV)
EPPS (1 mm aperture, 0.2° captured)	7×10^{-7}	~500
SMEPPS (4° captured)	3×10^{-4}	1.75
SMEPPS (1.2° captured)	3×10^{-5}	0.15

For more details, please see the corresponding poster in the poster session.

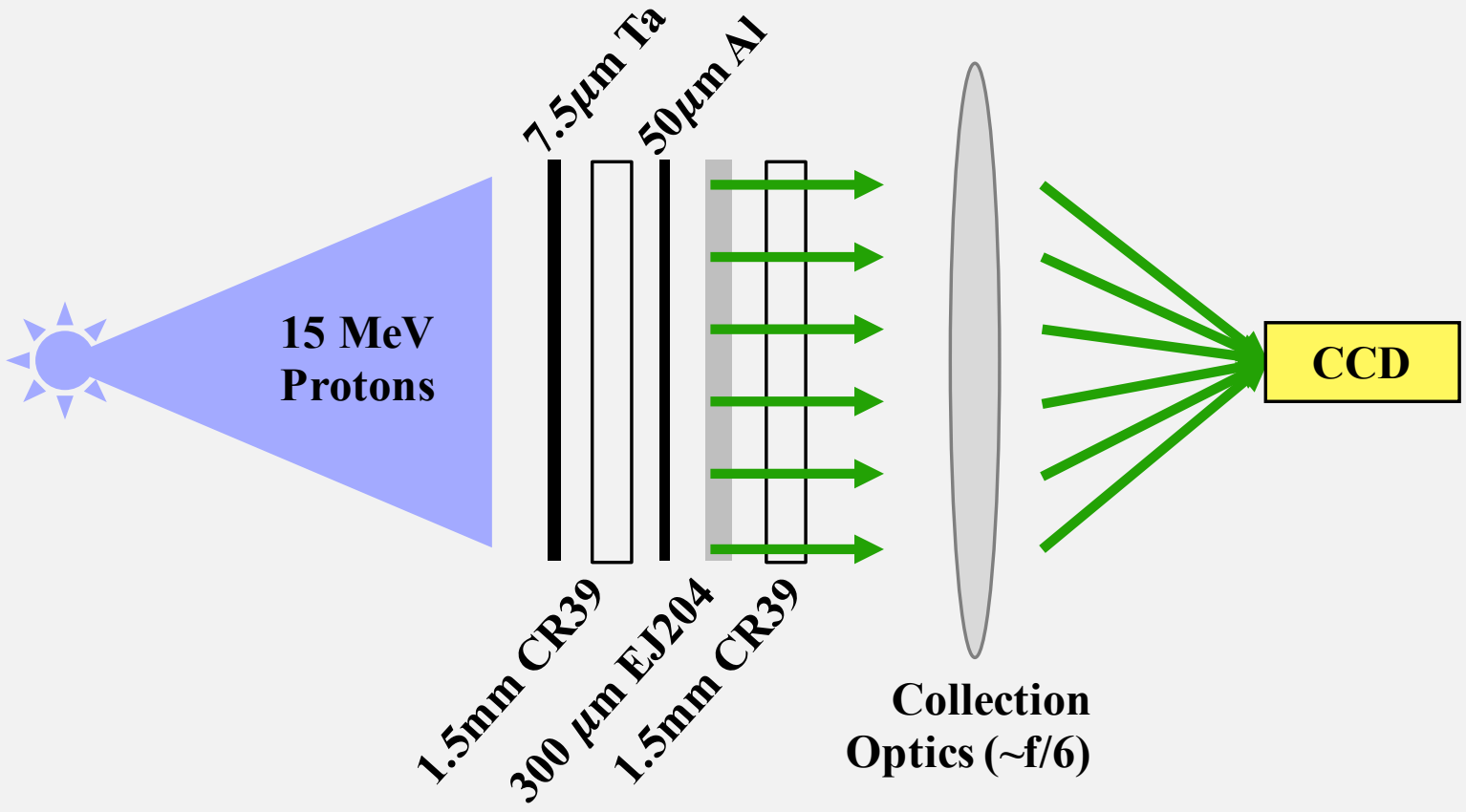
(22) Quick-look for CR39-based proton radiography

- Requested capability: new diagnostic capability
- Capability requirements:
  - utilize a scintillator in a standard CR39 pack where scintillated light is imaged through the last piece of CR39 onto a gated CCD
- Impact of requested capability:
  - this would provide immediate post-shot information on proton radiography campaigns while maintaining standard CR39 data acquisition
  - Shot-to-shot changes could be made regarding timing of proton data
  - Any campaign using the D3He proton backlighter would benefit (LLNL, LANL, MIT, …)
- Proposal sponsor: Mario Manuel (GA)
- Proposal support: D.B. Schaeffer (Princeton), Mathieu Bailly-Grandvaux (UCSD), K. Falk , A. Rasmus & K. Flippo (LANL), H.-S. Park (LLNL)

Community comments: Repeat of 2020 request to provide more details. Typical proton flux may provide ~100s of counts depending on exact design. Concern of x-ray background in scintillator needs to be addressed, but can be alleviated through fast (~2ns) scintillator decay times from TOF difference between 15MeV protons and x-rays. M Manuel can provide additional design support with facility as needed.

(22) Quick-look for CR39-based proton radiography

- Generic picture of a potential set up



Target Capability

(23) Planar Cryo on EP

Submitter: Marius Millot

- 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 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.

Community comments: Perennial request.

- Proposal sponsor: M. Millot (LLNL)
- Proposal support: M. Marshall (LLE), ICF/HED programs

Laser System

(24) Increased power on EP

Submitter: Marius Millot

- Requested capability: higher UV power Drive at EP
- Capability requirements: Deliver more than 1250 J in B1 and B2 ESG10v001
- Impact of requested capability: Improve the signal to background of multiple experiments using UV beams to generate secondary sources (eg X-ray Diffraction, radiography)
- Proposal sponsor: M. Millot
- Proposal support: K. Flippo (LANL), ICF/HED programs

Community comments: D. Canning says that System Science can look into this, but the scope and viability is uncertain.

(25) Omega: Any beam, any delay (or at least a 3rd leg)

- Requested capability: Omega: Any beam, any delay (or at least a 3rd leg)!
- Capability requirements: any beam, any delay
- Impact of requested capability: later times for BL and drive separations, this will allow a broader range of HED studies on Omega, making at least 3 (or 4) different groupings of large delays possible gives the flexibility to think about very complex heating experiments to study heat transport and other complex hydro. Also with EP capabilities to Omega this would help amplify that capability
- Proposal sponsor: LANL (Flippo)

Community comments: Perennial request. Slide from previous year.

(26) Opposing EP beams

- Requested capability: Opposing EP beams
- Capability requirements: Make 1 or 2 of EP beams have the ability to oppose the other two beams on EP.
- Impact of requested capability: This allows for more complicated colliding shock, jet, plasma experiments than can currently be executed on EP with the current geometry, and makes the facility as attractive as OMEGA for these experiments
- Proposal sponsor: LANL (Flippo)

Community comments: Perennial request. Slide from previous year.

(27) Smaller DPPs on Omega EP

- Requested capability: new hardware
- Capability requirements: at least one DPP in the 100-200um diameter range.
- Impact of requested capability: This will allow for higher intensity, single beam experimental configurations which is useful for LPI studies on EP. This also allows for smaller transverse plasma dimensions which is useful to collect more light in 'high' density plasmas from the 4w probe beam.

- Proposal sponsor: Mario Manuel (GA)
- Proposal support: F. Beg (UCSD), M. Bailly-Grandvaux (UCSD), C. McGuffey (GA), J. Kim (UCSD), W. Mori (UCLA), F. Tsung (UCLA).

Community comments: Perennial request. Slide from previous year.

(28) SSD on EP

- Requested capability: new hardware/capability

Community comments: Perennial request. Slide from previous year.

- Capability requirements: implement the 1D (or 2D) SSD capability on EP (Beam 4 preferred)

- Impact of requested capability: Temporal smoothing used with DPPs makes a much smoother beam profile than DPPs alone. For basic science LPI studies, SSD with DPPs makes the study more relevant to ICF conditions (even if only 1D).

- Proposal sponsor: Mario Manuel (GA),
- Proposal support: F.. Beg (UCSD), M. Bailly-Grandvaux (UCSD), C. McGuffey (GA), J. Kim (UCSD), W. Mori (UCLA), F. Tsung (UCLA), H.-S. Park (LLNL)

Code improvement

(29) Shared VisRad License

Submitter: Derek Schaeffer

- Requested capability: VisRad models are required as part of the process of designing and executing shots on OMEGA 60 and EP. Given the expense of acquiring individual licenses for every PI on a yearly basis, especially at universities, this requests suggests that LLE negotiate a VisRad license that can be shared by PIs.

- Capability requirements: fixed-seat or other form of shared VisRad license that PIs with allocated shot time on Omega can access to create LLE-required experiment designs.

- Impact of requested capability: instead of relying on PIs to acquire necessary and expensive VisRad software on a yearly basis, creates a shared LLE resource that PIs can use

Community comments:
Much discussion on this topic. Particular interest from smaller research groups and international users. Labs have open seat licenses. Prism had licensing issues in the past at universities and obviously need funding to continue providing support for Visrad. LLE and Prism to discuss possible licensing options offline

- Proposal sponsor: Princeton, PPPL
- Proposal support: P. Valdivia (UCSD), L. Willingale (Umich), K. Falk (HZDR), MIT, many others.