Documentation

(1) Documentation of Diagnostic Settings

- Requested capability: A system for recording diagnostic configurations on shot
- Capability requirements: Capture electronically and manually input diagnostic settings as they are for the shot to put in a document on the shot images and reports page.
- Impact of requested capability: This will allow for verification that the settings used on shot are the same as what is in the SRF.
- Proposal sponsor: Heath LeFevre(hjlefe@umich.edu), but, hopefully, all users would benefit
- Additional support: Camelia Stan (LLNL), Pia Valdivia (John Hopkins)

Community comments: This request generated a lot of discussion and may benefit from more specific details. It was noted that there is a comment box in the SRFs for each diagnostic and this may be under utilized right now. LLE may be able to use this comment box to not changes that are not included in the stand fields. An emphasis of the submitter was the desire to be able to confirm on-shot changes compared to the SRFs.

(2) Colby box delay recording

- Requested capability: recording of Colby box delays on all SRFs they are applied to.
- Capability requirements: Colby box delays are useful but can cause confusion as the values don't seem to be recorded on the SRFs. Any Colby box delay applied to a diagnostic should be recorded on the SRF.
- Impact of requested capability: Would seem to be widely beneficial.
- Proposal sponsor: Robbie Scott (robbie.scott@stfc.ac.uk)

Community comments: This request could potentially be included in the general diagnostic documentation request on the previous slides

(3) Standard SRF Configurations for DHe3 Backlighter Shots

- Requested capability: Incorporate a standard template in SRFs for shots that use a DHe3 backlighter capsule.
- Capability requirements:
  - Implement option to select standard beam parameters/template (DPR, DPP, focusing) associated with DHe3 backlighter shots.
  - Generate warnings if backlighter beams pose a threat to opposing ports.
- Impact of requested capability:
  - Prevent selection of beam parameters that are incompatible with facility requirements.
  - For example, much of a recent shot day was spent troubleshooting the setup for DHe3 backlighter beams because it wasn't clear to the facility or experimenters that the beam parameters in the SRFs would cause capsule blow-by problems.
- Proposal sponsor: W. Fox (PPPL), D.B. Schaeffer (Princeton), G. Fiksel (U. Michigan)

(4) Fully Online Safety Training Process

- Requested capability: Update the safety training process so that getting signature/talk from safety officer can be done remotely.
- Capability requirements:
  1. Teleconferencing app
  2. Online scheduling app (optional, email is probably sufficient)
- Impact of requested capability:
  - Would be very useful for ensuring OMEGA users remain up-to-date with their trainings while limiting the amount of time they spend onsite and reducing COVID risk
  - Ensure that training can still be completed if safety officers are gone when user is onsite
- Note: This capability may have already been added in response to COVID, but wanted to suggest it in case it hadn't.
- Proposal sponsor: B. Reichelt, J. Kunimune (MIT)

Community comments: Is this something that LLE is already working on? Could this be added to the remote PI training process?

(5) External (outside of LLE) access to neutronics database

- Requested capability: An internal LLE database has been set up to store all neutronics results (yields, Tion, bang time, rhoR, …) from all detectors (nTOF, NTD, …) running on a shot. This database contains a lot more data than the spreadsheets traditionally shared with PIs. **We request external access to these already stored data** (e.g., through the password-protected, access controlled OMEGA ops page)

- Capability requirements: The baseline request is access to the already stored data in the existing form. Nice to have: an interface where the user can query the database and/or plot data summaries

- Impact of requested capability: Having access to all measured and analyzed data for a shot is very helpful for any user in better interpreting their experiments. Write access for some users (e.g., MRS, GCD, …) could be an added benefit

- Proposal sponsor: M. Gatu Johnson, MIT, and anyone running implosions with DD or DT nuclear reactions: MIT, Imperial, V. Tech, LLNL, LANL, RAL, …

Community comments: Potentially reduces work for the neutronics team in terms of having to prepare reports for external PIs.

Calibration

(6) Gas Nozzle Characterization Station

- **Requested capability:** A Gas Nozzle Characterization Station will give the confidence on the density of the plasma in laser gas-jet experiments. In some conditions, the gas jet is not necessarily flowing in a steady-state regime and the valve trigger timing / applied voltage can strongly modify the jet density.

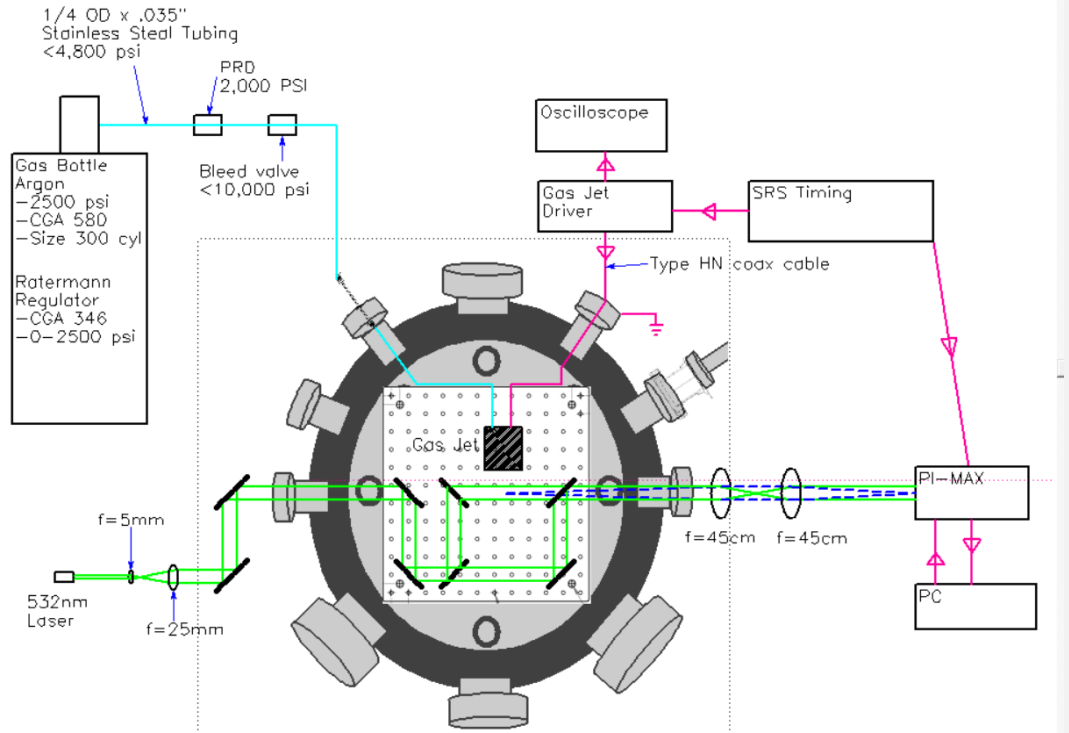
- **Capability requirements:** The goal will be to build the station for characterization of the system with the specific nozzle used for a specific experiment. It can be a TIM based (offline) system to characterize the nozzle in-place. UCSD is willing to provide characterization support for nozzles that will be fired at Omega.

- **Impact of requested capability:** In a recent experiment about LPI studies in magnetized plasmas, the density seemed too low and not reproducible. Without prior characterization, it is currently uncertain if this was due to the voltage/timing combination or due to the nozzles.

Community comments: Dustin Froula and Aaron at LLE may also want to support this effort.

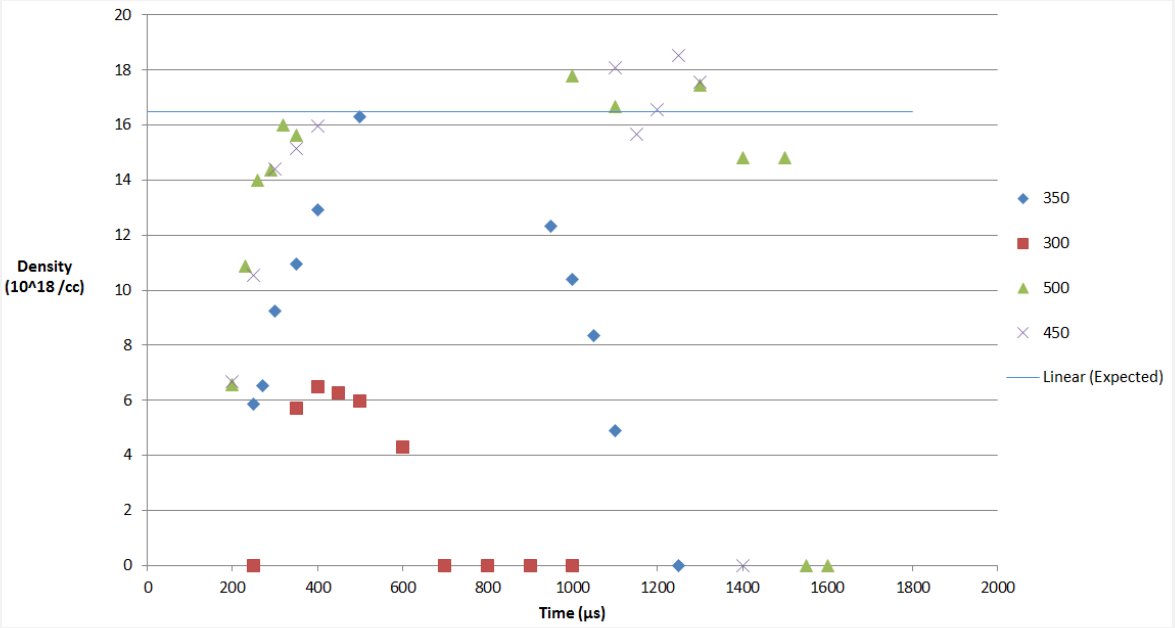
- **Proposal sponsor:** Users of a GJS, Mario Manuel (GA), Farhat Beg (UCSD), Mathieu Bailly-Grandvaux (UCSD). Additional interest from Louise Willingale and potentially MIT.

(6) Gas Nozzle Characterization Station



Gas Jet Setup

Density vs Time: 5mm M=5.6, 455 psi Ar, z = 1mm, Varying Voltages



Valve open time is related to the driving voltage

(7) Calibration of the SABS diagnostic

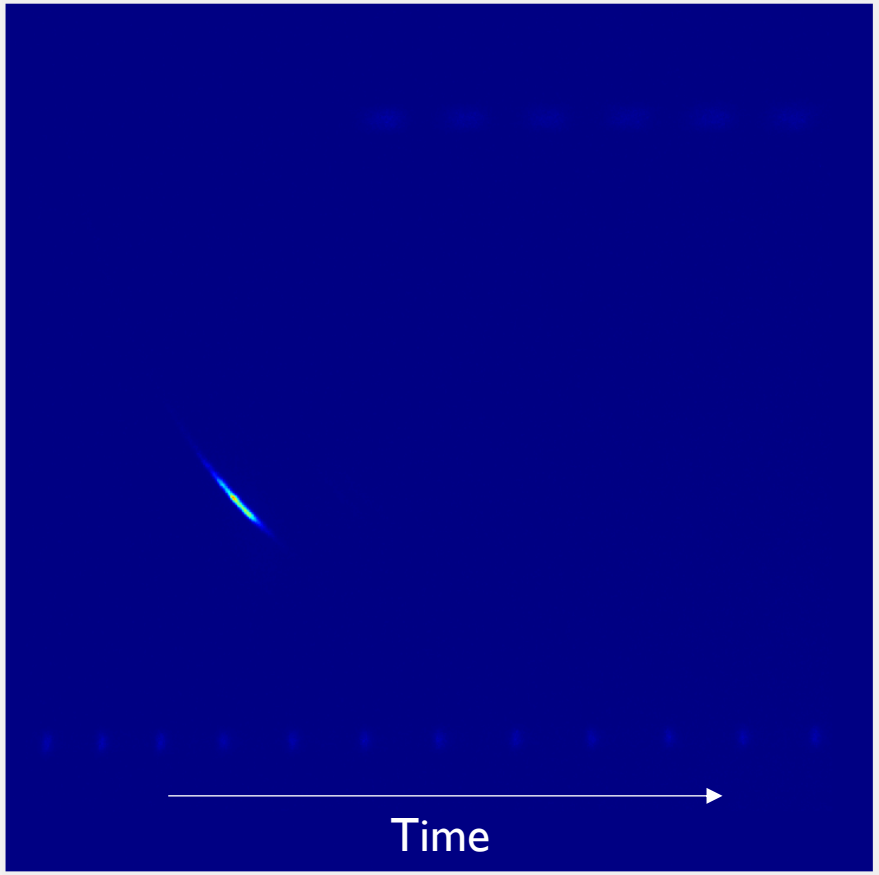
- **Requested capability:** The light is collected and guided along a long optical fiber to the diagnostic. The spectral dispersion of the light, associated with the refraction index of the fiber, has to be deconvoluted in the final data. Besides, one could benefit from an absolute photon calibration of the diagnostic for comparison with analytical and computational models.

- **Capability requirements:** The optical fiber light dispersion could be characterized with a fiber-coupled spectrometer, as well as the photon absolute calibration using a known source.

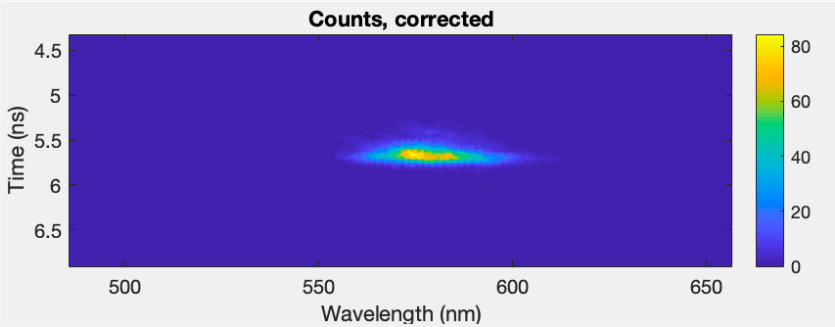
- **Impact of requested capability:** For SRS or SBS measurements (for LPI studies) or Doppler shift (for ion acceleration), the spectral information (and to a lesser extent, the photometry) are required for a detailed comparison with models.

- **Proposal sponsor:** Mario Manuel (GA), Farhat Beg (UCSD), Mathieu Bailly-Grandvaux (UCSD), Christopher McGuffey (GA), Joohwan Kim (UCSD), Warren Mori (UCLA), Frank Tsung (UCLA).

(7) Calibration of the SABS diagnostic



SABS raw image acquired during IonAccel-EP-20A



SRS measurement during MagLPI-EP-20A

* *Part of the shift along the spectral axis is due to the group velocity dispersion in the long optical fiber.*

(8) XRFC Calibrations

Community comments: This is similar to the info available for NIF framing cameras

- Requested capability: Perform calibration shots for typical XRFC parameters to get flat field images.
- Capability requirements:
  - Field a uniform x-ray photon source (e.g. illuminated Au sphere).
  - Generate flat field images for typical (or requested) XRFC bias voltages, electrical pulses (e.g. 200 ps), and strip delays.
- Impact of requested capability:
  - Allows extraction of quantitative information from XRFC images when comparing signals along or between strips.
  - Lack of calibration limits, for example, the ability to measure plasma temperatures by comparing signals through different filters, since there is no absolute reference for the signal along or between strips.
- Proposal sponsor: D.B. Schaeffer (Princeton), W. Fox (PPPL)
  - Additional: Liz Merritt, Kirk Flippo (LANL)

Diagnostics

(9) User Capability Request: ASBO/SOP on EP TIM 14

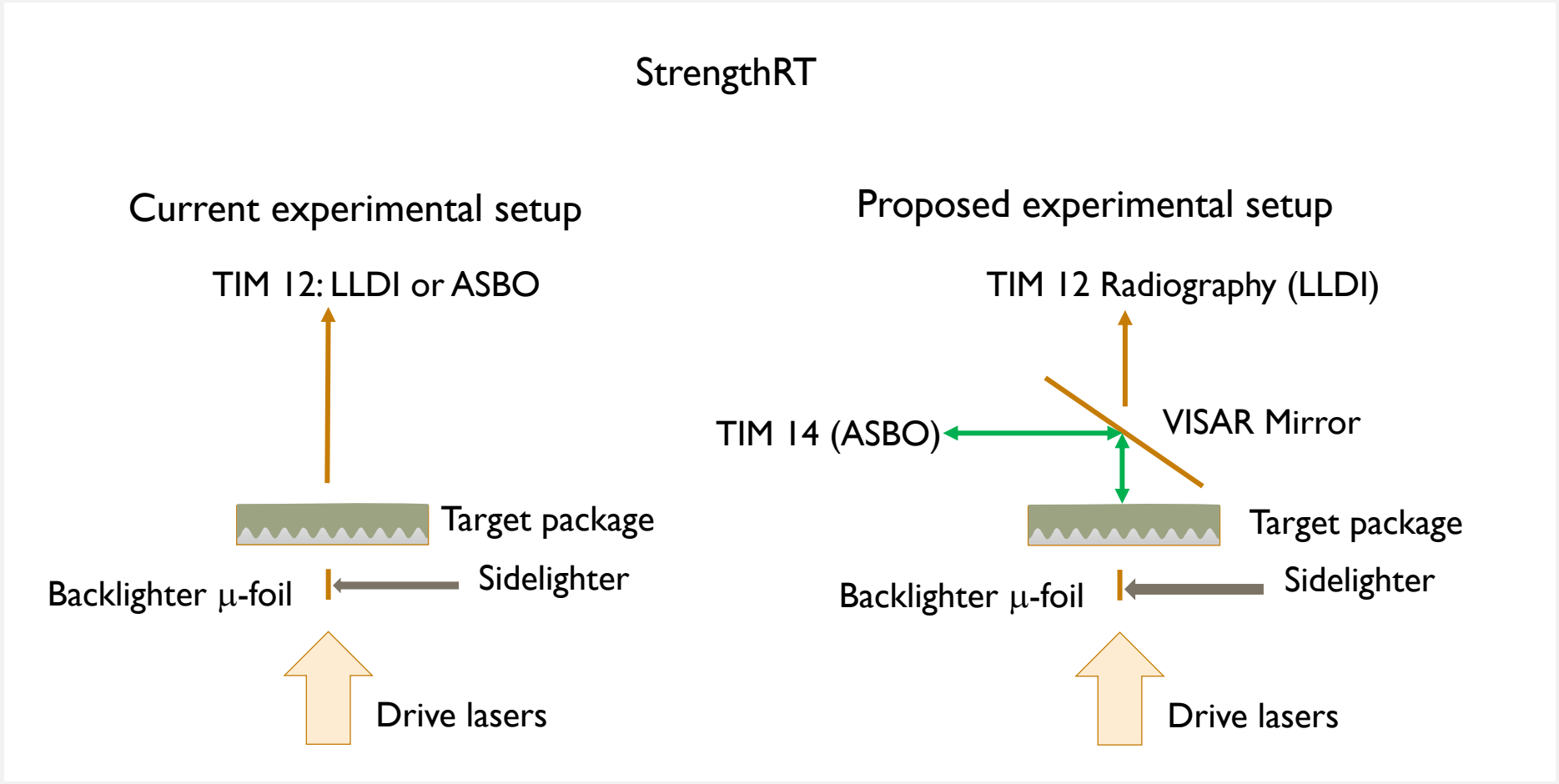
Camelia V Stan (LLNL), Hye-Sook Park (LLNL), Matt Hill (AWE)

- We would like ASBO/SOP to be available on TIM 14. This may involve some hardware development, as well as instrument qualification.
- Ideally, ASBO/SOP on TIM 14 should in all ways be comparable 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.
- This proposal is being sponsored by Camelia V. Stan (LLNL), Hye-Sook Park (LLNL), and Matt Hill (AWE). Jiang Sheng (LLNL) and Yuan Ping (LLNL) also have a stake in the development.

Community comments: This request is very similar to a previous requests currently under consideration. Previous request slides is included for reference.

(9) User Capability Request: ASBO/SOP on EP TIM 14

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



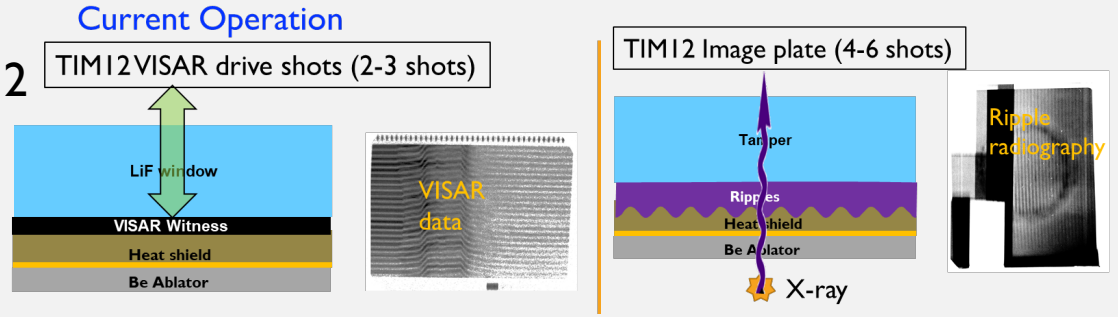
(9) User Capability Request: ASBO/SOP on EP TIM 14

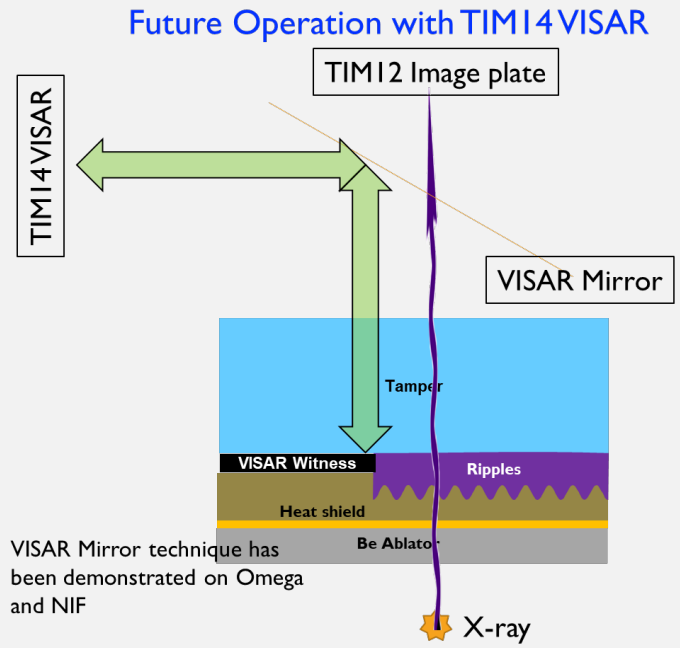
Camelia V Stan (LLNL), Hye-Sook Park (LLNL), Matt Hill (AWE)

- 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





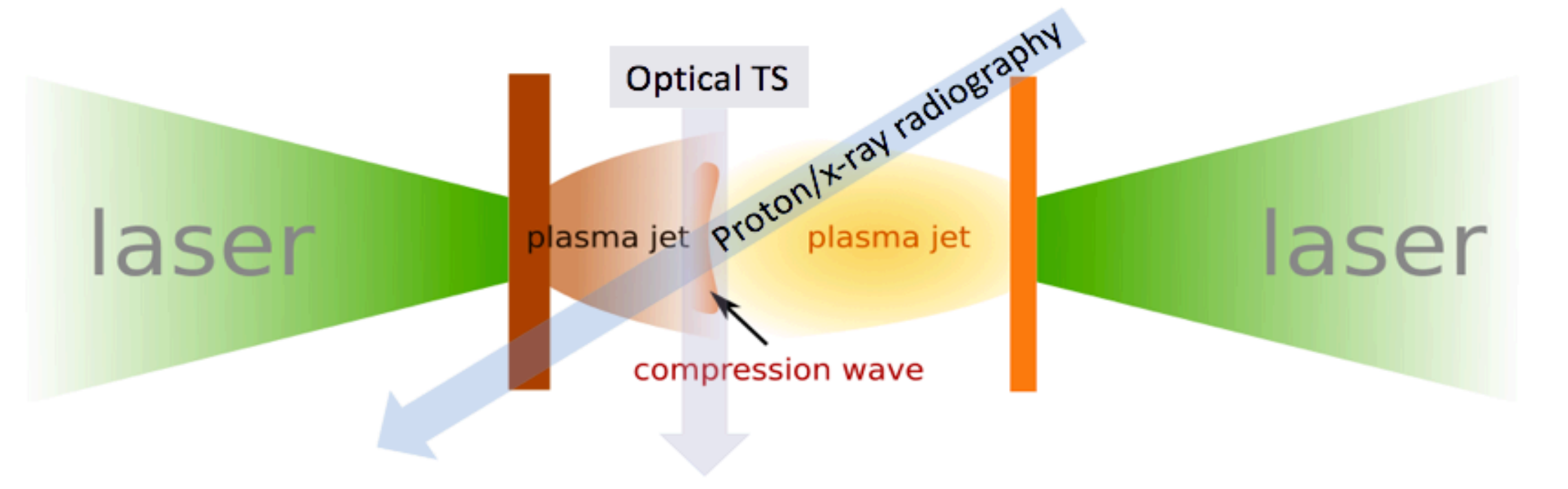
(10) Better spatial resolution for OTS

- Requested capability: hardware capability, diagnostic calibration, software improvements, etc.? (1) Better spatial resolution for OMEGA-60 OTS (optical Thomson spectrometer), ideally to ~ 1 um. (2) OTS availability at Omega EP.
- Capability requirements: where possible, detailed or quantitative description of what the goal should be. For detailed plasma transport (non-local electron transport) experiments, spatially resolving OTS is crucial.
- Impact of requested capability: what value will this add? (examples from specific campaigns are useful here) Getting the OTS resolution to 1 um level would open a whole new level of experiments with astrophysical plasmas, shocks and plasma scales/gradients.
- Proposal sponsor: what users will benefit from this? Who should be contacted to represent this request and provide additional information?
- Example: previously submitted proposal by T. Weber (LANL) and K. Falk , Grigory Kagan experiments with diffusion, LBS experiments by G. Gregori.
- Additional: Mario Manuel (GA)

Community comments: Previous requests have often centered on streaked imaging improvement, and not increased resolution.

(10) Better spatial resolution for OTS

- Please include illustrative figure, images, data, experimental setup diagrams, etc.



(11) A new TIM based particle spectrometer

- Requested capability: hardware capability, diagnostic calibration, software improvements, etc.?
  - Hardware/diagnostic capability
- Capability requirements: where possible, detailed or quantitative description of what the goal should be.
  - Charged particle spectrometer capable of deflecting high-energy (5-100 MeV) electrons and positrons outside of the bremsstrahlung shower produced when particles are generated
- Impact of requested capability: what value will this add? (examples from specific campaigns are useful here)
  - This diagnostic will enable measurements of the charge, number, and density of positrons produced in experiments as well as the betatron signal produced in SMLWFA experiments.
- Proposal sponsor: what users will benefit from this? Who should be contacted to represent this request and provide additional information?
  - In the short term, users who are working on source demonstration will benefit from this diagnostic. In the long term, the sources development enabled by this diagnostic will open up lab astro studies requiring high-density positron beams and broadband keV radiography sources.

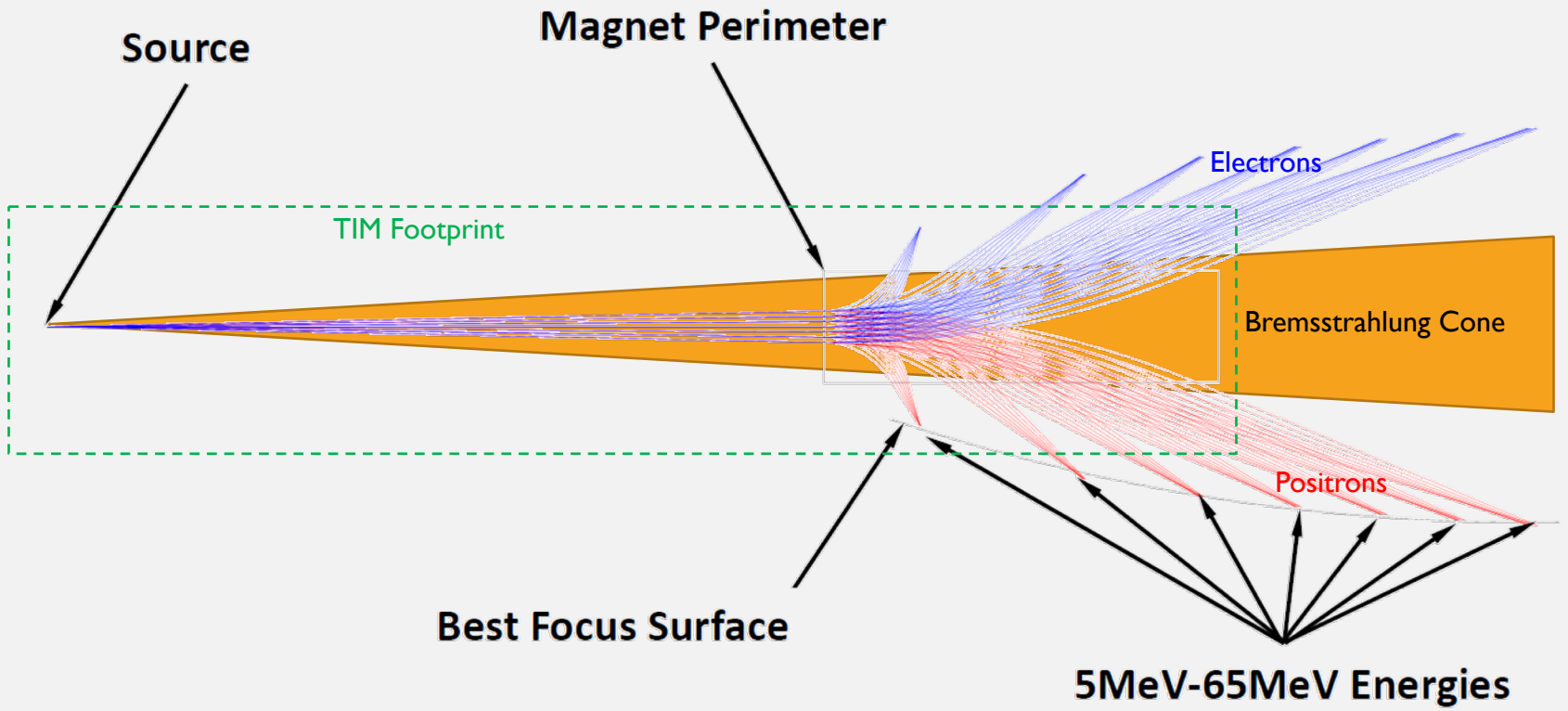
submitted by Hui Chen, LLNL, Gianluca Gregori, Oxford University, and Bob Bingham, STFC/RAL/CLF

Additional support from Louise Willingale, Johan Frenje (MIT), Mathieu Bailly-Grandvaux (UCSD), Scott Feister

Community comments: Development of this type of diagnostic could benefit the whole community, and potentially be of benefit to other facilities as well. We should poll the community for broader input on design ideas and specification, and potentially establish a working group.

(11) A new TIM based particle spectrometer

- Please include illustrative figure, images, data, experimental setup diagrams, etc.

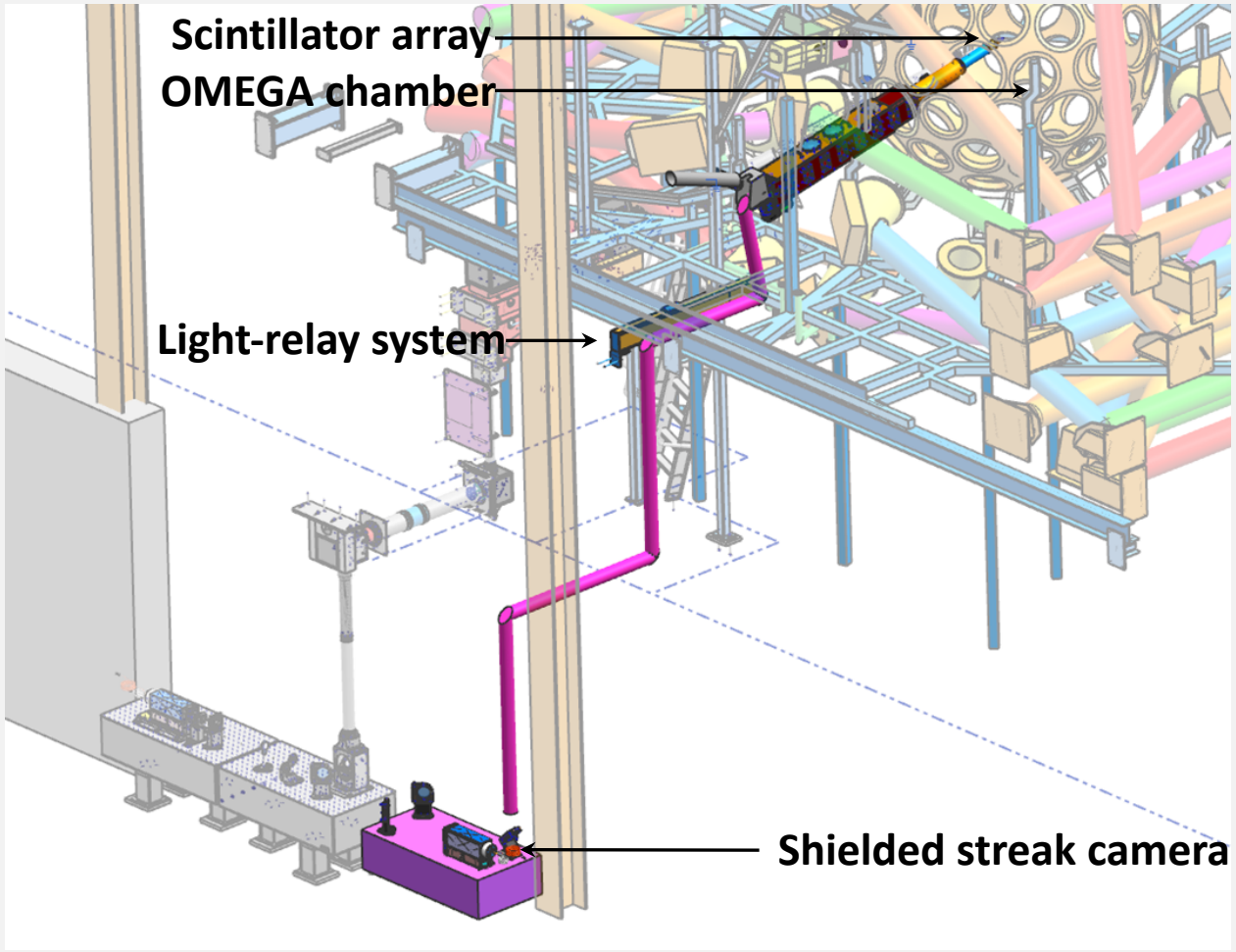


(12) Implement the CryoPXTD diagnostic to measure x-ray histories in multiple energy bands, subject to high neutron-yield environments

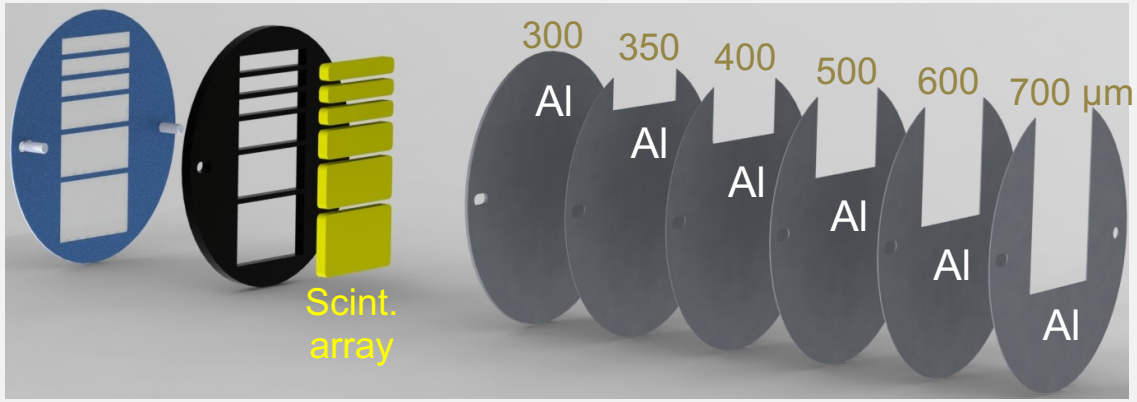
- Capability requirements:
  1. New light relay connecting TIM5 to streak camera in a shielded location
  2. Facility resources to construct the system
  3. Ross Streak Camera (already acquired for this diagnostic OLUG FNR 2018)
  4. Absolute X-ray sensitivity (use x-ray KODI imaging system with IP for abs calibration)
- 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 sponsors: P. Adrian, N. Kabadi, J. Frenje, et al. (MIT); J. Knauer, R. Betti, H. Rinderknecht; R. Shah, C. Stoeckl (LLE); G. Kagan (Imperial); B. Srinivasan (Virginia Tech); B. Bachmann, M. Hohenberger (LLNL); …

(12) A conceptual/engineering design for the Cryo PXTD already exists

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

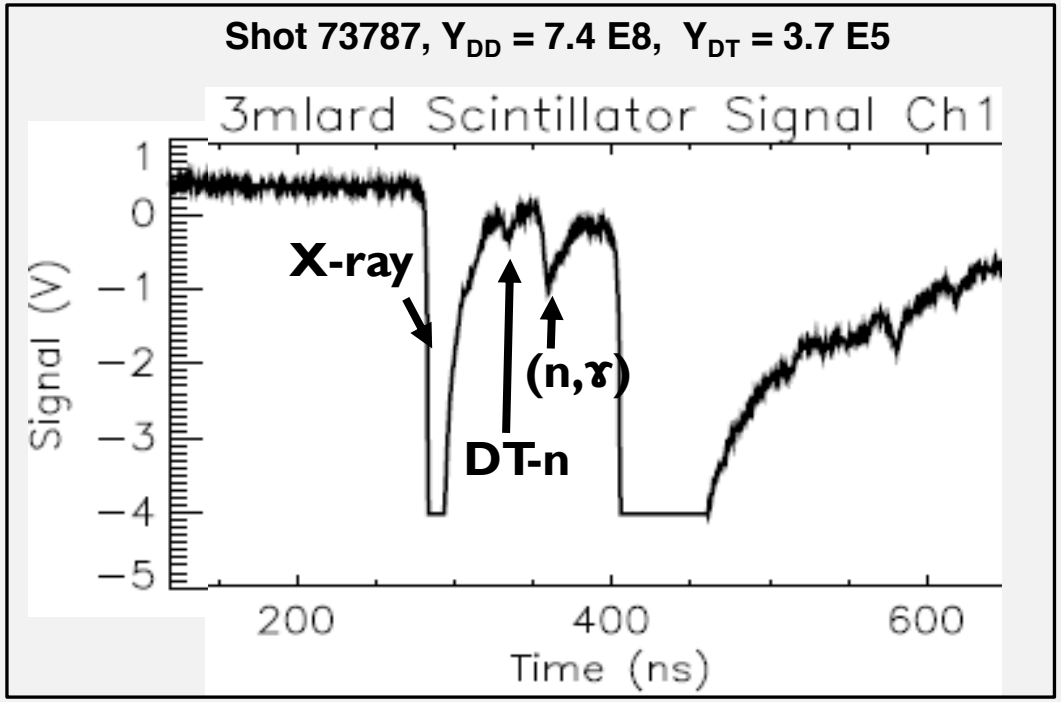
* D. Wiener for optical design and M. Bedzyk for Mech engineering

(13) Request to implement a sensitive nTOF detector for secondary DT-n measurements (yield and possibly spectrum)

- **Requested capability:**
  - Detector needs to work for yields above 5e5, in presence of a strong x-ray background signal for a 10% fuel-ρR determination
  - Secondary DT-n are routinely measured with the 3mLARD and 1.7mnTOF but X-ray and (n-ϒ) background are too significant for an accurate measurement
- **Impact of requested capability:**
  - Users of D^3He or D_2 gas-filled implosions will benefit from a fuel-ρR measurement using this
  - Measurements will be very useful for magnetized implosion studies
- **Interested parties:** A. Bose, P. Adrian, J. Frenje (**MIT**), G. Kagan (**Imperial**) Y. Kim, N. Hoffman (**LANL**), C. Forrest, J. Peebles, J. Davies, R. Betti (**LLE**), H. Sio, J. Moody (**LLNL**), Bailly-Grandvaux, F. Beg (**UCSD**), R. Scott (**RAL**), …

$$D + D \rightarrow p\ (3.0\ MeV) + T\ (1.0\ MeV)$$

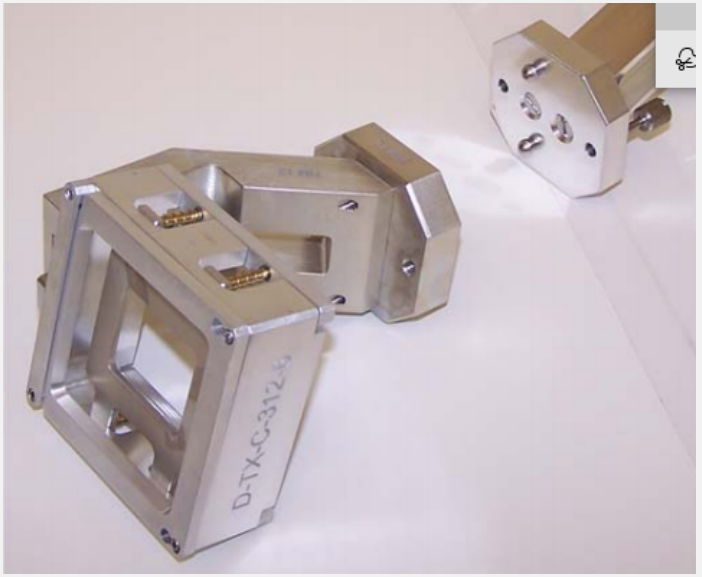
$$T\ (1.0\ MeV) + D \rightarrow \alpha + n\ (11.8 - 17.1\ MeV)$$



Community comments: The intent is for a new detector, but improvements to the current detectors could also be sufficient. However, a new detector would give a 3rd line-of-sight useful for symmetry studies. This was submitted in last year's F&Rs as well.

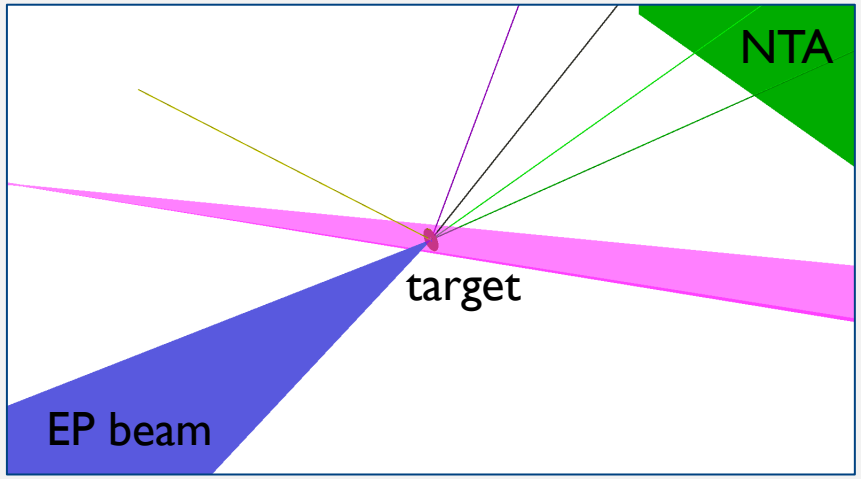
(14) Extending NTA film pack capacity for proton measurements

- Requested capability: measurement of high proton energy range (>100 MeV) on the NTA diagnostic
- Capability requirements: modification of NTA to allow film packs thicker than 18mm

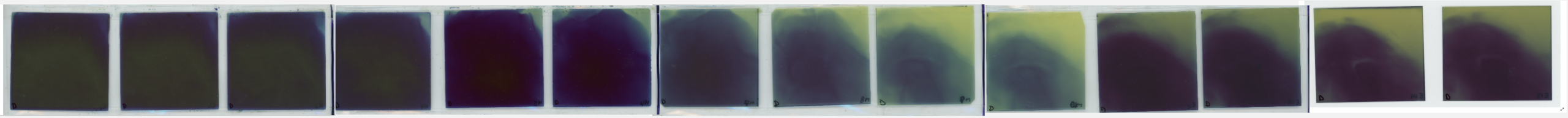


- Impact of requested capability:
  - Film stacks are the standard for measuring the maximum proton energy and beam angular energy distribution from laser-driven ion acceleration. Thicker stacks mean better energy resolution or range.
  - In the application of proton radiography, a thicker stack means more snapshots of field evolution.
- Proposal sponsors: Chris McGuffey (GA), Joohwan Kim (UCSD), Mathieu Bailly-Grandvaux (UCSD), and Farhat Beg (UCSD), Additional: K. Falk

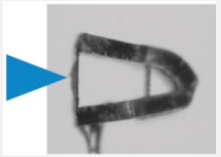
(14) Extending NTA film pack capacity for proton measurements

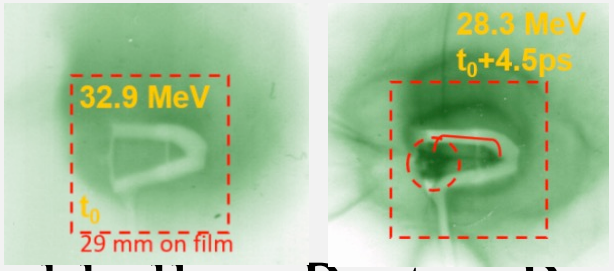


- In a recent experiment, high energy protons were measured to the back of the film pack.
- Standard NTA packs go to 60 MeV.
- Extending to 100 MeV would require additional filters ~7 mm steel or 20 mm Al.



Energy increasing 10 – 70 MeV …How far can it go ?





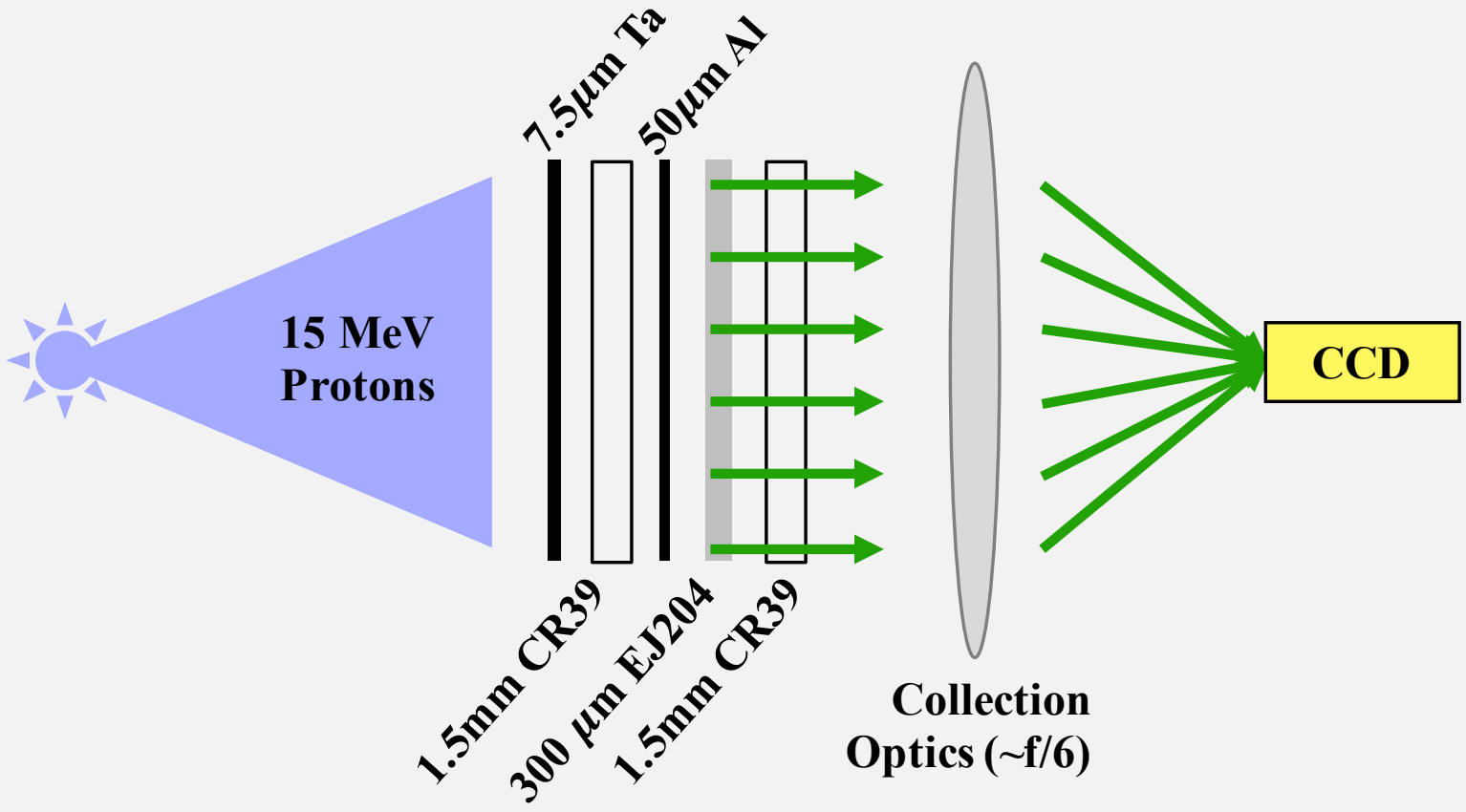
- Thicker packs would allow Proton Radiography probing with ‘stiffer’ protons.

(15) 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)
- Additional support: D.B. Schaeffer (Princeton), Mathieu Bailly-Grandvaux (UCSD), K. Falk , A. Rasmus & K. Flippo (LANL), H.-S. Park (LLNL)

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

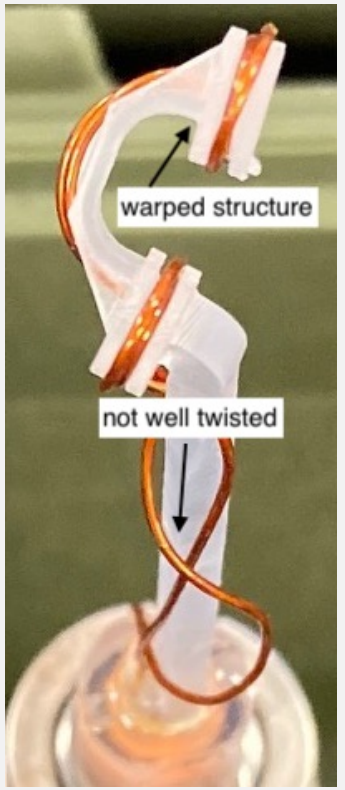
- Generic picture of a potential set up



Target Capability

(16) Improved MIFEDS Construction

- Requested capability: More careful construction of MIFEDS coils.
- Capability requirements:
  - New procedures to prevent coil windings from distorting MIFEDS structure, possibly by using stronger plastic.
  - More careful twisting of wire leads.
- Impact of requested capability:
  - Prevents wire tension from distorting the designed MIFEDS shape.
  - Improves MIFEDS-generated fields and reduces stray fields created by unwanted wire loops.
- Proposal sponsor: W. Fox (PPPL), D.B. Schaeffer (Princeton), G. Fiksel (U. Michigan)



(17) Heated and room temperature D, T, H and ^{3}He target filling with variable fill fraction and pressure

- Requested capability: Diffusion filling with variable HDT^{3}He fraction into glass and plastic capsules
- Capability requirements:
  - Generate a prescribed gas mixture of H, D, T, and ^{3}He
  - pressurized system capable of filling glass and plastic capsules to 20 atm
  - handle room temperature and heated fills.
- Impact of requested capability:
  - Coordination with LLNL for glass capsules, or DT filled CH capsules adds complexity and greatly increases chance of target issues. Currently there is no capability to fill CH capsules with HDT^{3}He at LLNL or LLE.
  - This capability is essential for the use of the tri-particle DT^{3}He backlighter
  - Demand for custom HDT^{3}He fills will continue to grow due to exciting and interesting physics that can be investigated related to mix, multi-ion, kinetic, flow effects, and many other areas.
- Proposal sponsors: N. Kabadi, G. Sutcliffe, M. Gatu Johnson, et al. (MIT); B. Pollock, J. Moody, A. Zylstra(LLNL); K. Meaney, Y. Kim (LANL); W. Fox, D. Schaeffer(PPPL); C. McGuffey (GA), M. Bailly-Grandvaux (UCSD), H. Rinderknecht (LLE), G. Kagan (Imperial), B. Srinivasan(VT)

Community comments: Similar to previous requests (included after this as a reference). This request expands capabilities to CH capsules and custom D & T fills ratios.

[Ref. 2019 Submission] Tritium gas fill capability into a warm spherical capsule

- Requested capability: Tritium gas fill capability into a warm spherical capsule
- Capability requirements: Either diffusion or fill tube filling would benefit many campaigns
  - Filling station capable of handling (a) pre-mixed gas reservoirs such as DT, HT, and T3He, (b) pressurized system up to 15 atm, (c) room temperature targets and
  - Fill-tube filling station would allow monitoring of mounted capsule gas pressure at TCC before shot
- Impact of requested capability:
  - Have been relying on LLNL for these fills. Shipping process adds risk – LANL lost three shot days due to shipping issues last year. LLE fills are also always secondary to NIF fills on LLNL fill station.
  - Need for this capability will only grow (audience suggested to "bite the bullet now")
- Proposal sponsor: LANL DARKMIX & Double Shell campaigns. Any campaigns requiring DT3He backlighter. Many nuclear campaigns

[Ref. 2019 Submission] Special gas fills using variable fuel mixture, with or without tritium

- Requested capability: Special gas fills using variable fuel mixture, including tritium (HDT, DT, HT, T3He, Argon with T, etc, doping for DD or D3He)
- Capability requirements: Capsule filling station capable of mixing fuels of different percentages including or not including tritium
- Impact of requested capability:
  - Current tritium mix fills are currently completed at Livermore and transported to Rochester. Multiple errors ands mistakes in this process have lost shot days. Having the capability at Rochester simplifies experiment preparation and minimizes ability for mistakes.
  - Reoccuring problem for non-tritium fills – this specifically a problem for different dopant levels
- Proposal sponsor: LANL TrMix/AsymMix/DARKMIX

Laser System

(18) Parameterized laser pulse-shaping

- Requested capability: the ability to flexibly control the as-shot laser pulse shape by changing key parameters (points in power-time space) within the pulse shape.

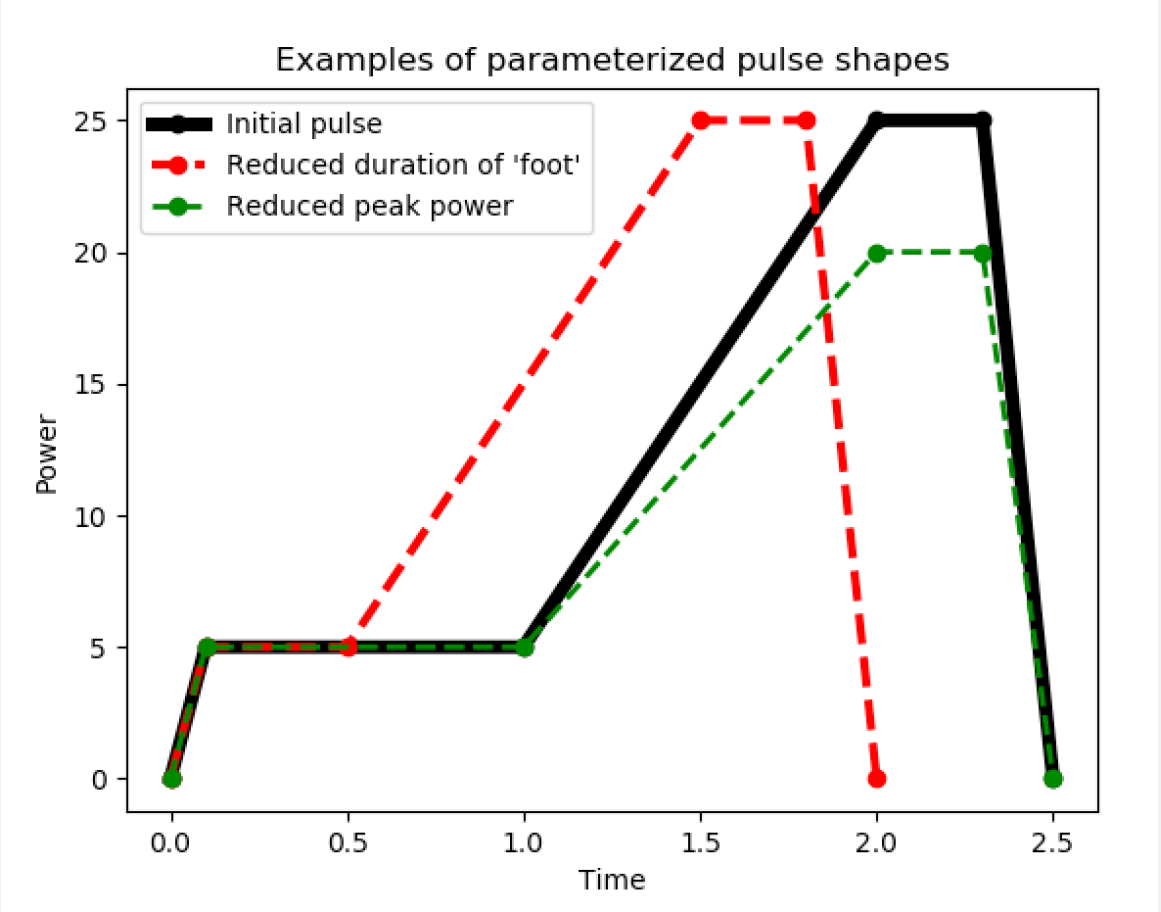
- Capability requirements: laser pulse shapes are typically constructed from a number of points in power-time space, between which the power is linearly interpolated. If the points could be changed on the shot-day this would greatly add to the flexibility of the system.

- Impact of requested capability: the ability to have more flexible laser pulse shaping than is currently possible. Would have benefitted UK Hydro-kinetics 19 & 20.

- Proposal sponsor: All users who use complex pulse shapes. Robbie Scott (robbie.scott@stfc.ac.uk)

(18)Parameterized laser pulse-shaping

- Note picket not shown as this is already flexible



(19) Request for a dedicated short-pulse beam for OMEGA 60

- Requested capability: Dedicated short-pulse beam for OMEGA 60
- Capability requirements: A dedicated short-pulse beam for OMEGA 60 not tied to EP
  - Ideal: laser capability at least equivalent to current EP short pulse (which is already well-understood for TNSA at OMEGA)
- Impact of requested capability:
  - Enables short-pulse diagnostics and short-pulse interactions now only available on joint shots
  - Example: TNSA proton imaging on any shot --- for high-resolution images, higher proton energies, immediate results (film), and reduced complexity in comparison to capsule backlighter implosions
- Proposal sponsor: Joseph Levesque (jmlevesque@lanl.gov)

Community comments: This request generated a lot a discussion and may be more appropriate for the long-term facility discussion in April. Next suggested steps included: (1) Polling the community for desired short-pulse beam specifications, (2) estimating the overall impact of the new capability in the community, and (3) preparing a white paper on the results. It would also be worthwhile to assess whether or not a single pre-existing OMEGA-60 beam could be modified to fit this need. This request could tie in to other work with other advanced light sources and LaserNET US.

(20) 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), Farhat Beg (UCSD), Mathieu Bailly-Grandvaux (UCSD), Christopher McGuffey (GA), Joohwan Kim (UCSD), Warren Mori (UCLA), Frank Tsung (UCLA).

Community comments: Repeat of an earlier request from before 2019 (Christian Stoeckl). System has a 200 um DPP limit.

(21) SSD on EP

- Requested capability: new hardware/capability
- 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), Farhat Beg (UCSD), Mathieu Bailly-Grandvaux (UCSD), Christopher McGuffey (GA), Joohwan Kim (UCSD), Warren Mori (UCLA), Frank Tsung (UCLA). Additional: H.-S. Park (LLNL)

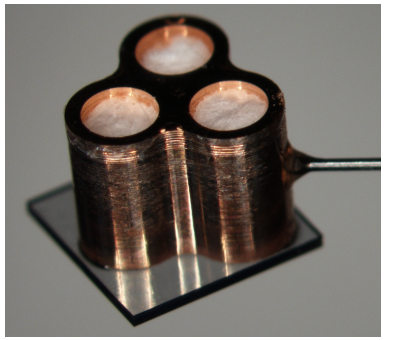
Community comments: This capability did used to exist on Beam 4, but the system was taken to NIF.

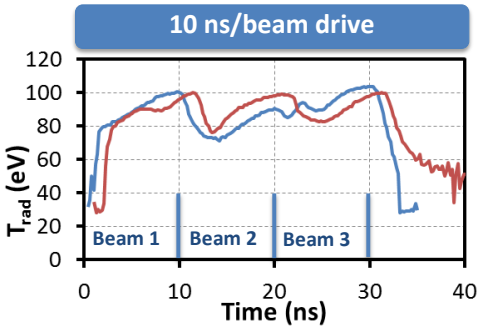
(22) [Ref. 2019 Submission] Longer duration OMEGA EP UV (and IR?) beams

- Investigate the feasibility of having longer duration OMEGA EP UV beams, e.g. 15-20ns
  - Audience also expressed interest in feasibility of longer IR beams
- Currently, each OMEGA EP UV can deliver 4.4kJ in 10ns. Three such beams sequentially fired in time have been used to demonstrate a sustained T_R= 90eV x-ray drive for 30ns
- Laboratory astrophysics experiments driven with long duration x-ray drives are important to establish connection and relevance to astrophysical scenarios

- Capability will benefit:
  - Laboratory photoionized plasmas in steady-state, i.e. Photo-Ionization Equilibrium (PIE)
    - Longer duration x-ray drive will enable PIE at lower densities thus increasing astrophysics relevance
  - Could replace stitched pulses on some of current experiments
- Proposal sponsor: Mancini (UNR), LLNL, LANL

- Gatling-Gun in OMEGA EP has demonstrated T_R= 90eV for 30ns
- Measurement performed with CEA's miniDMX





2020: The strength campaign at LLNL (POC Camelia Stan) would like to add it's support and interest to ongoing efforts in developing this capability.

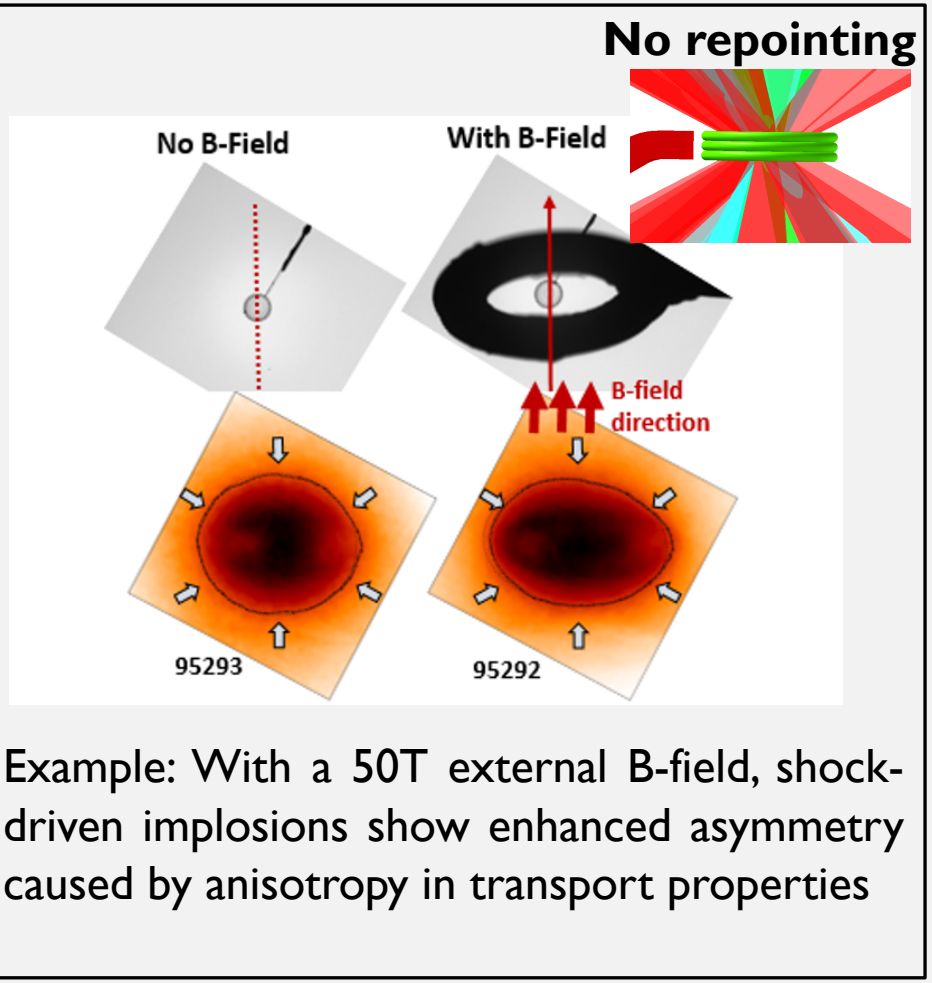
Code improvement

(23) Implement MHD capabilities to the multi-D ICF code ASTER

- **Requested capability:** Implement MHD capabilities in the 3-D code ASTER. This involves implementing solvers for the induction eqn., Nernst term and Braginskii thermal transport

- **Impact of requested capability:**
  - Study implosion symmetry under different magnetized configurations
  - Estimate magnetization effects on yield and temperature
  - Study transport properties in a magnetized plasma

- **Interested parties:** A. Bose, J. Frenje, R. Petrasso et. al. (**MIT**), I. Igumenshchev, J. Peebles, J. Davies, R. Betti, M. Campbell (**LLE**), H. Sio, J. Moody (**LLNL**), B. Srinivasan (**V. Tech.**), S. Baalrud, D. Bernstein (**U. Iowa**), Bailly-Grandvaux, F. Beg (**UCSD**), S. Atzeni (**Sapienza**)



Example: With a 50T external B-field, shock-driven implosions show enhanced asymmetry caused by anisotropy in transport properties