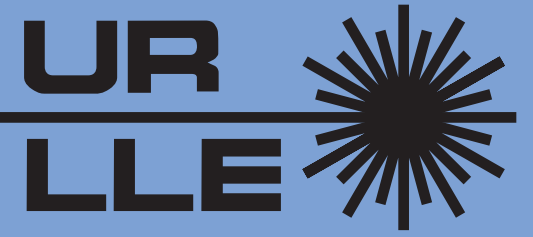


Omega Facility Diagnostic Highlights



C. SORCE, M. MILLECCHIA, D. MASTROSIMONE, A. SORCE, S. INGRAHAM,
R. E. BAHR, T. R. BOEHLY, S. P. REGAN, and P. A. JAANIMAGI

University of Rochester, Laboratory for Laser Energetics

Experimental Support Group

Formed in Response to OLOG 2009 Recommendations

- Participate in briefings with users (internal and external) to help optimize configurations and strategies
- Prepare diagnostics for Omega and MTW experiments (for example: x-ray framing camera front ends, neutron diagnostics)
- Operation of complex diagnostic systems during target shots (for example: VISAR, Dante, etc.)
- Perform initial quick look and data analysis as appropriate

Role in Omega Facility Diagnostic Projects

- Working with LLE Experimental Division scientists on diagnostic development and qualification
- Assist outside users with qualification of experimental diagnostic equipment

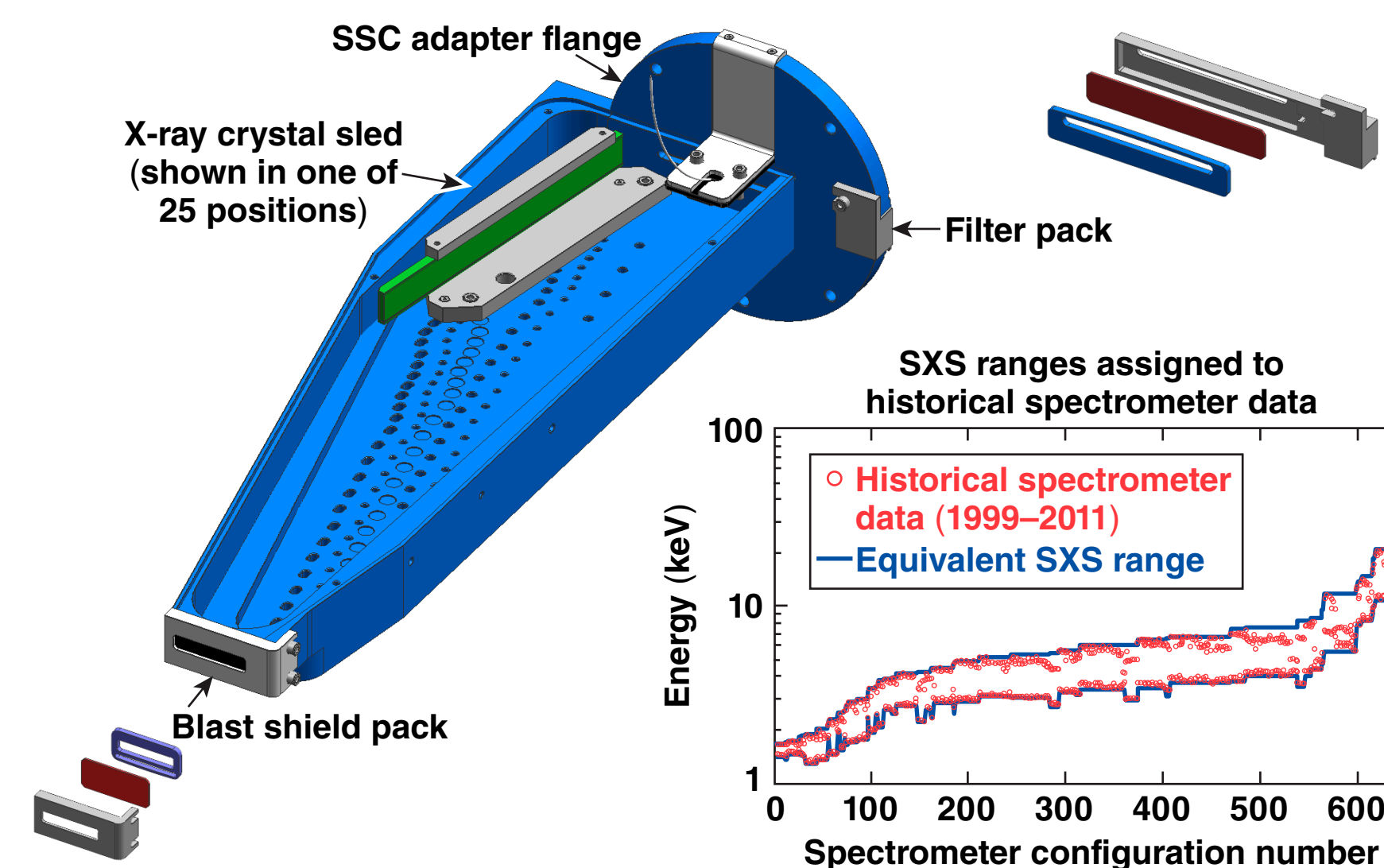
"The LLE Experimental Support Group Leader (ESGL) will be the liaison and initial POC for all externally generated projects. The ESGL will coordinate the introduction of these projects into the INST 7700 process including assisting the external user with completing a detailed project summary."

E20925

Streaked X-Ray Spectrometer (SXS)

Summary:

- SXS was designed to replace the existing NOVA spectrometers
- SXS features TIM serviceable filtering
- 25 discrete locations allow multiple crystals to provide a variety of ranges from ~1.5 keV to 20 keV



Specification	OMEGA	OMEGA EP
Locations	TIM's 1,2,3,4,5,6	TIM's 11,12,13,14
Energy range	1.5 keV to 20 keV	
Blast shields	Up to 0.030 in. thick	
Filters	0.000 in. to 0.030 in. thick	
Crystals	RbAP, PET, ADP, Quartz	
Instrument PI: S. Regan Instrument Specialist: M. Millecchia		
Notes	<ul style="list-style-type: none"> User-provided crystals can be supported with advance notice Not allowed on TIM's opposite short-pulse beams Beam interferences possible on OMEGA with off-TCC configurations 	

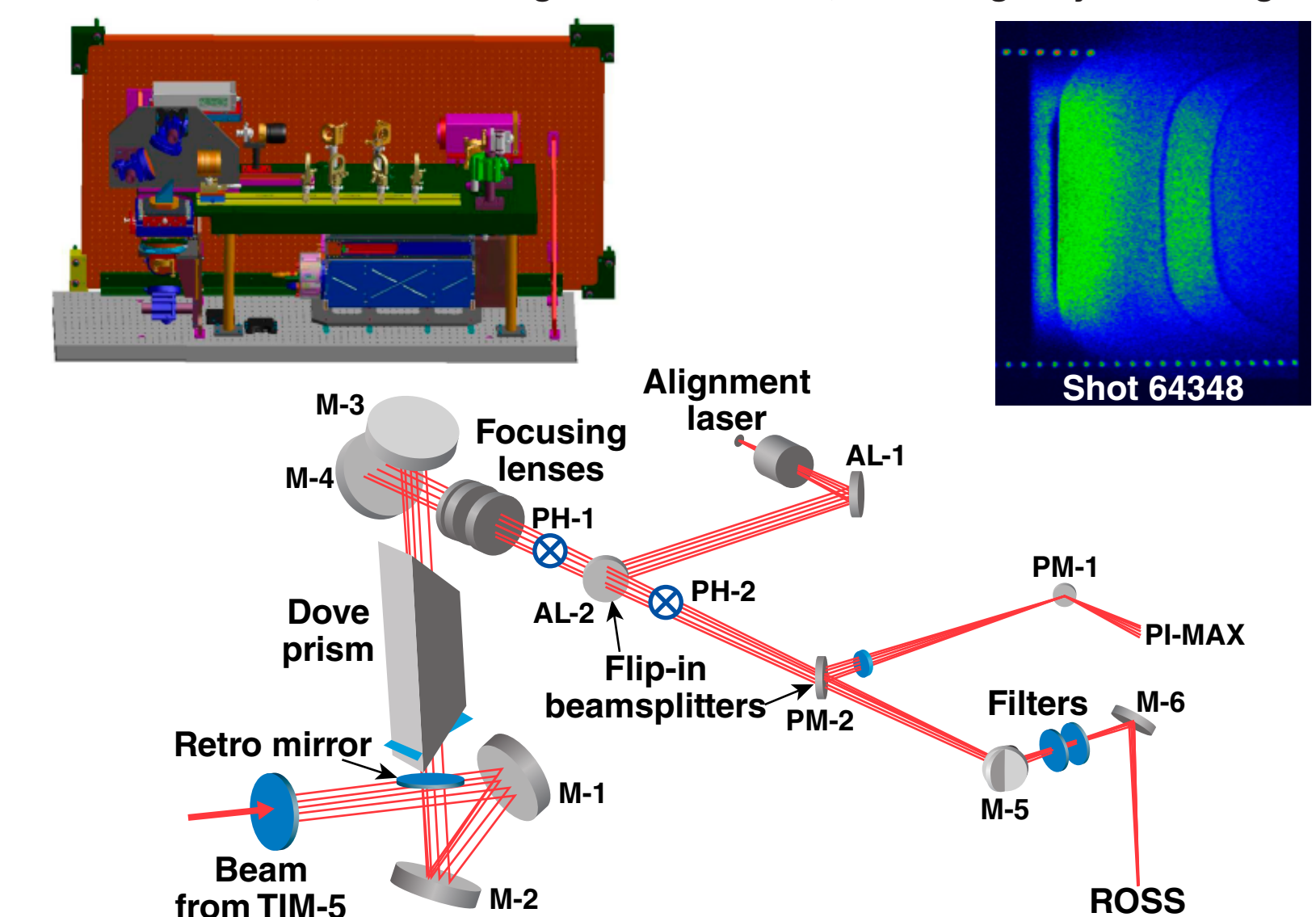
This diagnostic will be presented in detail as a contributed poster at the 19th Topical High-Temperature Plasma Diagnostic Conference, Monterey, CA, 6-10 May 2012.

E20925

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Summary:

- SOP ROSS replaced the Hamamatsu-based system
- SOP ROSS provides an increased field of view, improved spatial resolution, increased signal-to-noise ratio, and a larger dynamic range



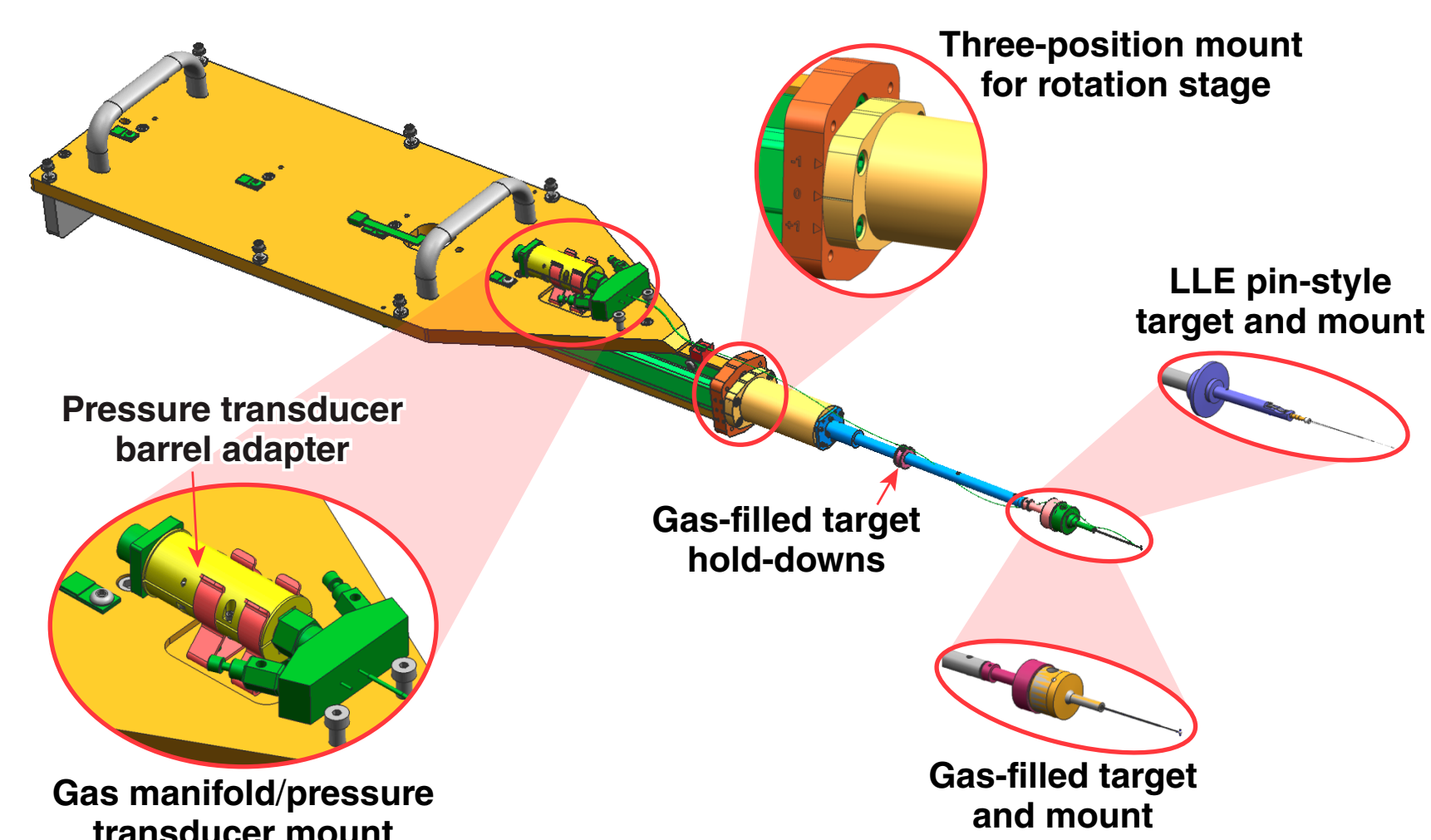
Specification	OMEGA
Locations	TIM-5
TIM optics	Standard or off-axis VISAR telescope
Field of view	1 mm
Bandpass	590 to 850 nm standard
Timing references	2 ω green fiducial—absolute timing to OMEGA T-0 ROSS fiducial comb—sweep speed linearity calibration
Photocathode	Vertical with 0° Dove Prism Rotation $\pm 90^\circ$ possible in 1° increments
Filters	6-in. bandpass filter serves as enclosure window; neutral density filters; narrow bandpass filters may be installed in front
Instrument PI: T. Boehly Instrument Specialist: A. Sorce	
Notes	Alignment of the SOP ROSS system is accomplished by projecting a source from the diagnostic table onto the target. This eliminates the need to allocate a second TIM during setup

E20927

LLE TIM-Based Target Positioner (TTP)

Summary:

- The LLE TTP System was designed to replace the existing LLNL units
- The new systems maintain all of the functionality of the original units
- Enhancements include remote operation from the ESO station



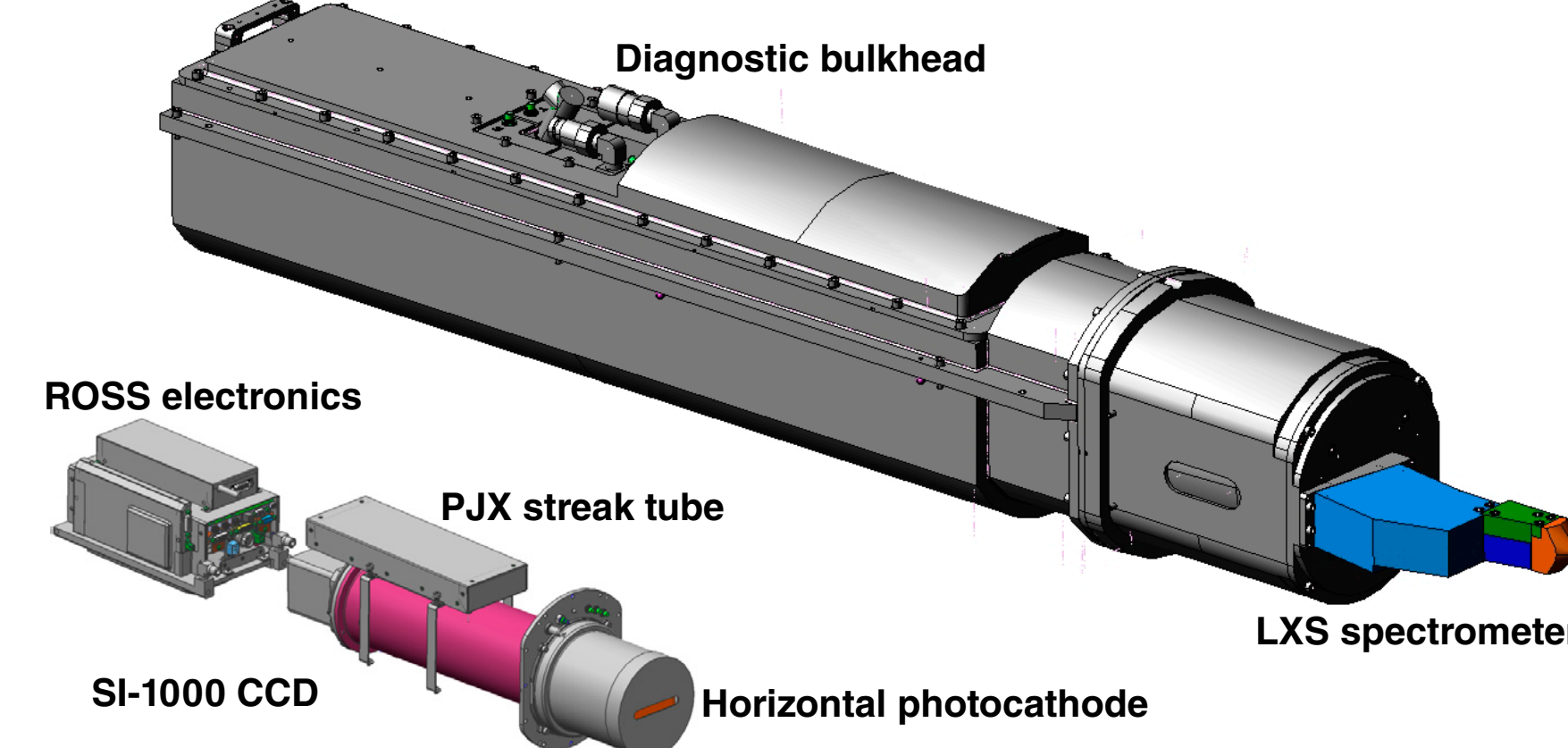
Specification	OMEGA	OMEGA EP
Locations	TIM's 1, 2, 3, 4, 5, 6	TIM's 10, 11, 12, 13, 14
Resolution	TIM ϕ : 1 μ m TIM θ : 1 μ m TIM transport: 27 μ m	TIM ϕ : 1 μ m TIM θ : 1 μ m TIM transport: 1 μ m
Rotation	Full travel: $\pm 210^\circ$; angular resolution: $\leq 52 \mu$ rad; backlash: $\leq 2.7^\circ$	
Availability	Two units are selectable for use on each system and each system has a dedicated "hot" spare	
Range	15-mm spherical radius at TCC	
Compatible transducers	Ashcroft P/N: A2SCM0215L160#VAC-G (preferred) Ashcroft P/N: K17M0215B960#VAC-#4077 (original) Foxboro/CT P/N: 1124-08A-C53-B1 (in use by LLNL)	
Instrument PI: D. Mastro Simone Instrument Specialist: D. Hassett		
Notes	<ul style="list-style-type: none"> Targets with Nova mounts may not be used opposite a short-pulse beam Rotation stage has three positions to eliminate the need for shimming OMEGA EP backlighter interferes with TTP in TIM-14 	

E20928

Second-Generation PJX Streak Camera (PJX-2)

Summary:

- PJX streak camera incorporates ROSS electronics into an air box design
- PJX-2 provides temporal and spatial resolutions superior to SSCA



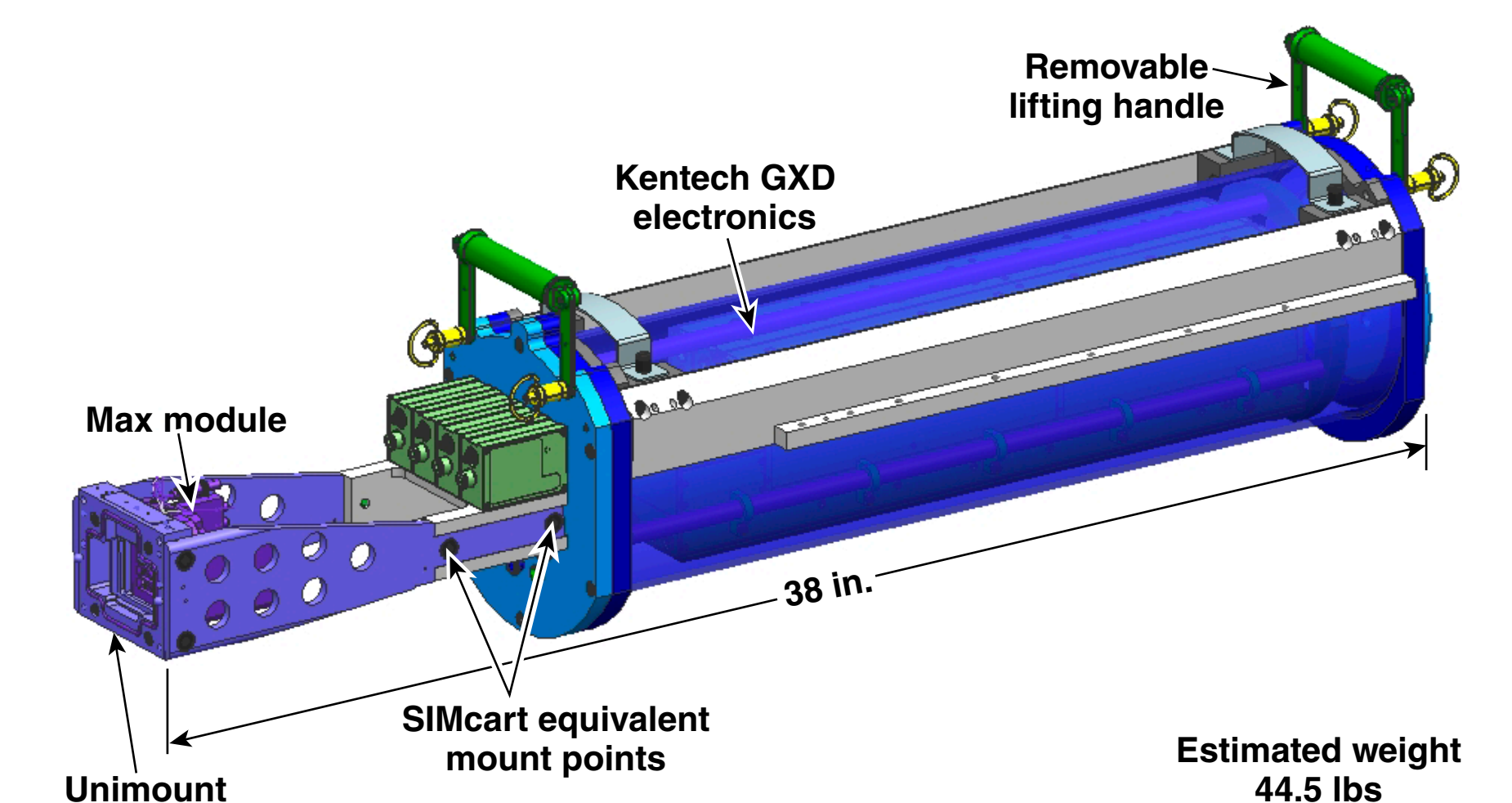
Specification	OMEGA	OMEGA EP
Locations	TIM's 1, 2, 3, 4, 5, 6	TIM's 10, 11, 12, 13, 14
Sweep speeds	Two speeds available, <1 ns and ~5 ns (full window)	
Temporal resolution	<10 ps std, <5 ps inv	
Spatial resolution	4 lp/mm standard, 25 lp/mm inverse at 50% contrast	
Spatial magnification	0.4 standard, 4.0 inverse	
PC size (effective)	60 mm standard, 6 mm inverse	
PC orientation	Horizontal—fixed	
PC material	KBr on Be, Au on CH	
Front ends	LXS spectrometer (flat field and SXS in near future)	
Fiducial	4 ω fiducial available	None
Image acquisition	SI-1000 TE cooled camera with 1:1 fiber relay, E2V chip 2048 \times 2048 pixels at 13.5 μ m ²	
Instrument PI: P. A. Jaanimagi Instrument Specialist: S. Ingraham		
Notes	<ul style="list-style-type: none"> SXS ranges will vary from those on SSC because of a difference in photocathode location Commissioned for use on OMEGA in a limited number for TIM's in FY12Q3 Availability on all OMEGA and OMEGA EP TIM's is anticipated by FY13Q1 	

E20929

Sydor X-Ray Framing Camera (XRFC-Sydor)

Summary:

- Sydor Instruments is packaging a new framing camera for LLE
- the camera uses Kentech gated x-ray detector (GXD) pulser electronics
- the detector head will use an LLNL max module
- new cameras will be compatible with all existing XRFC front-end configurations



Specification	OMEGA	OMEGA EP
Locations	TIM's 1, 2, 3, 4, 5, 6	TIM's 10, 11, 12, 13, 14
Front ends	Existing XRFC qualified configurations including OMEGA tilted hardware, ZSpec, GTS, DD-MMI, etc.	
Detector	Film or Sydor VCCD	
PFM's	200 ps, 400 ps, 1000 ps	
Availability	First unit FY13Q1, second unit FY13Q3	
Instrument PI: C. Sorce Instrument Specialist: R. E. Bahr		
Notes	<ul style="list-style-type: none"> Arbitrary max module rotation will not be available initially, but may be accomplished in the future with custom hardware if the need arises The second unit will feature a fast pulser and function as a replacement to XRFC 2 that was allocated to NIF; this unit will have a fixed pulse length Software and controls are being developed by LLE for use at the Omega Facility 	

E20930

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Role in Omega Facility Diagnostic Projects



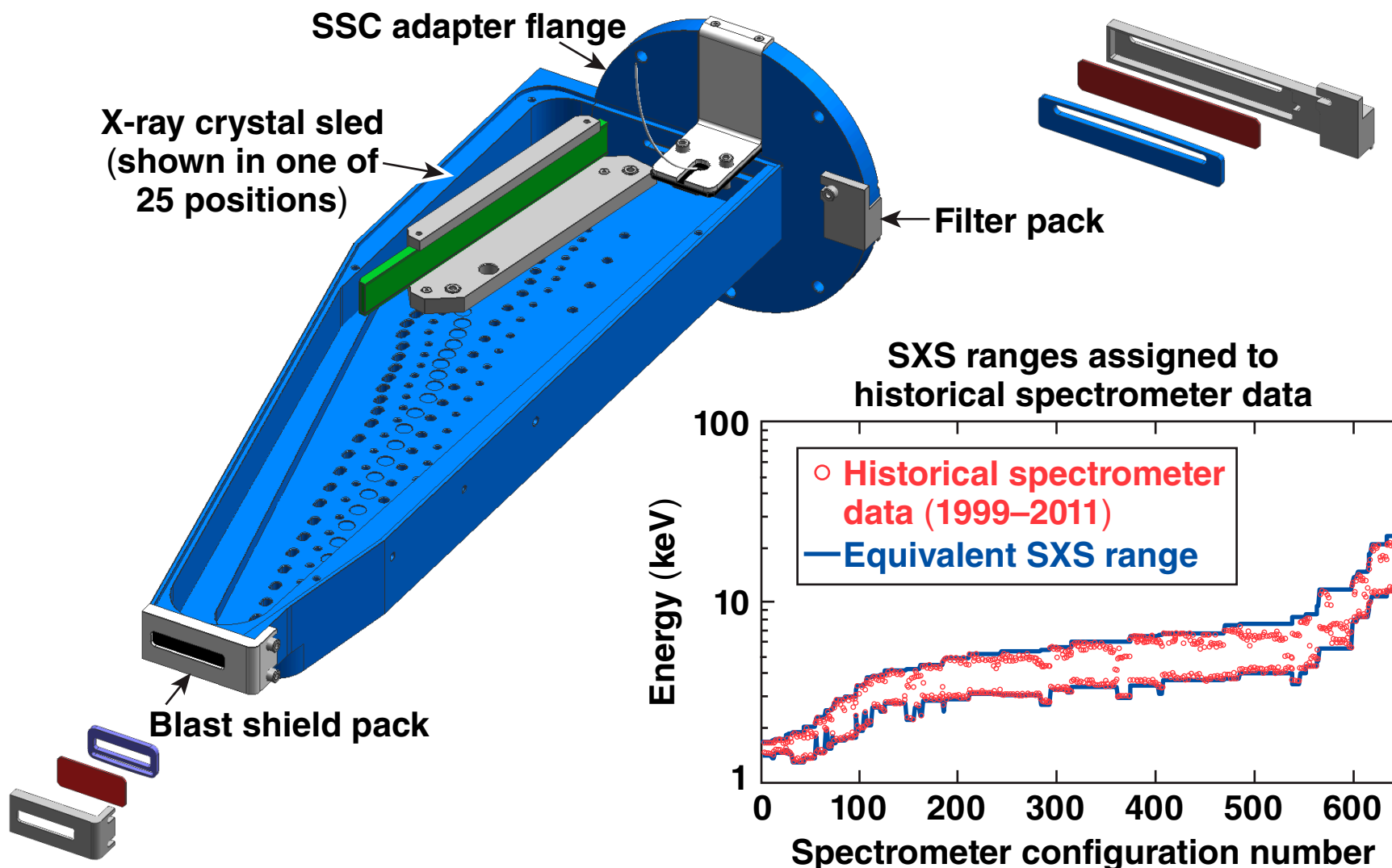
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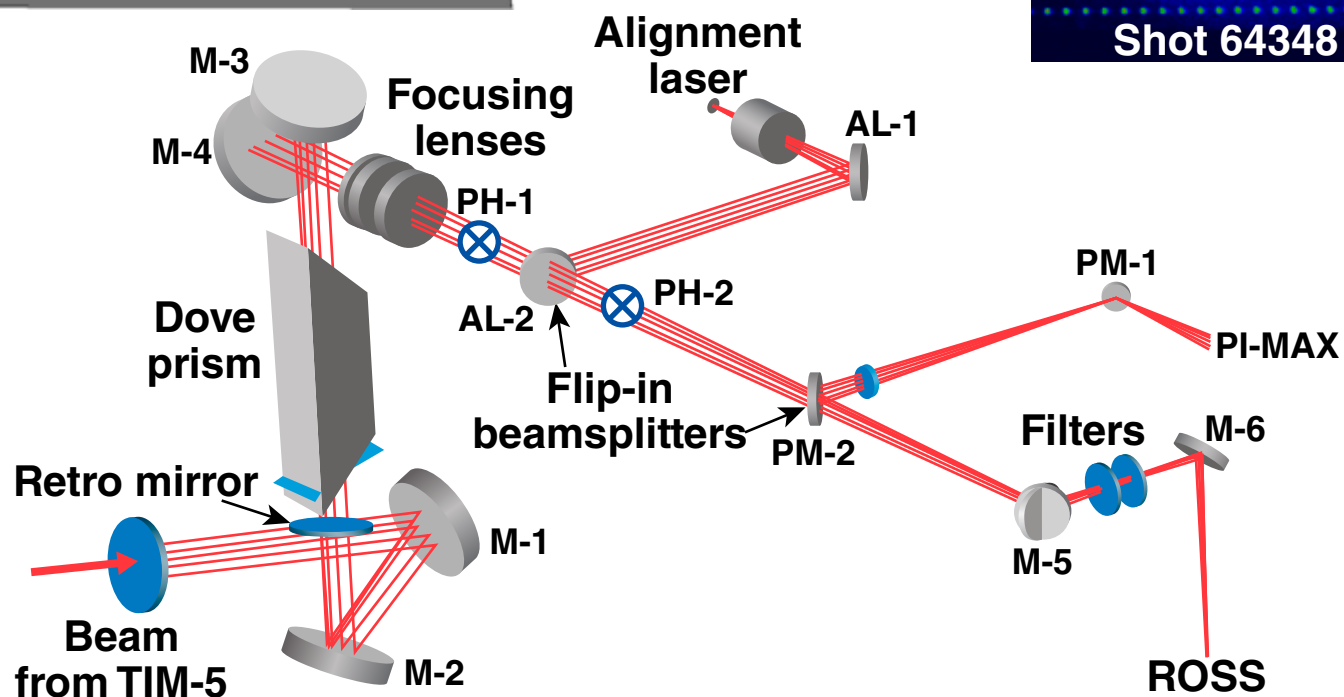
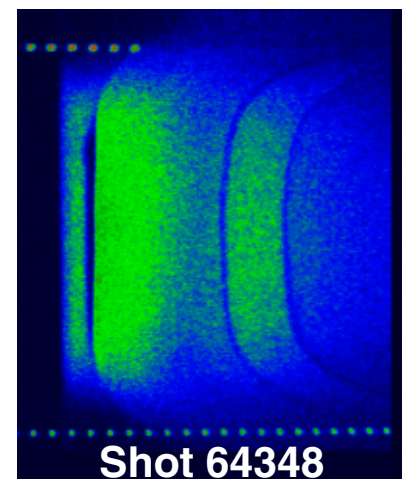
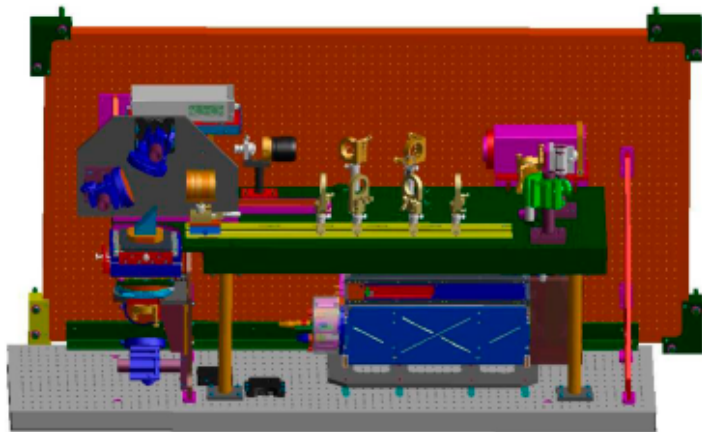
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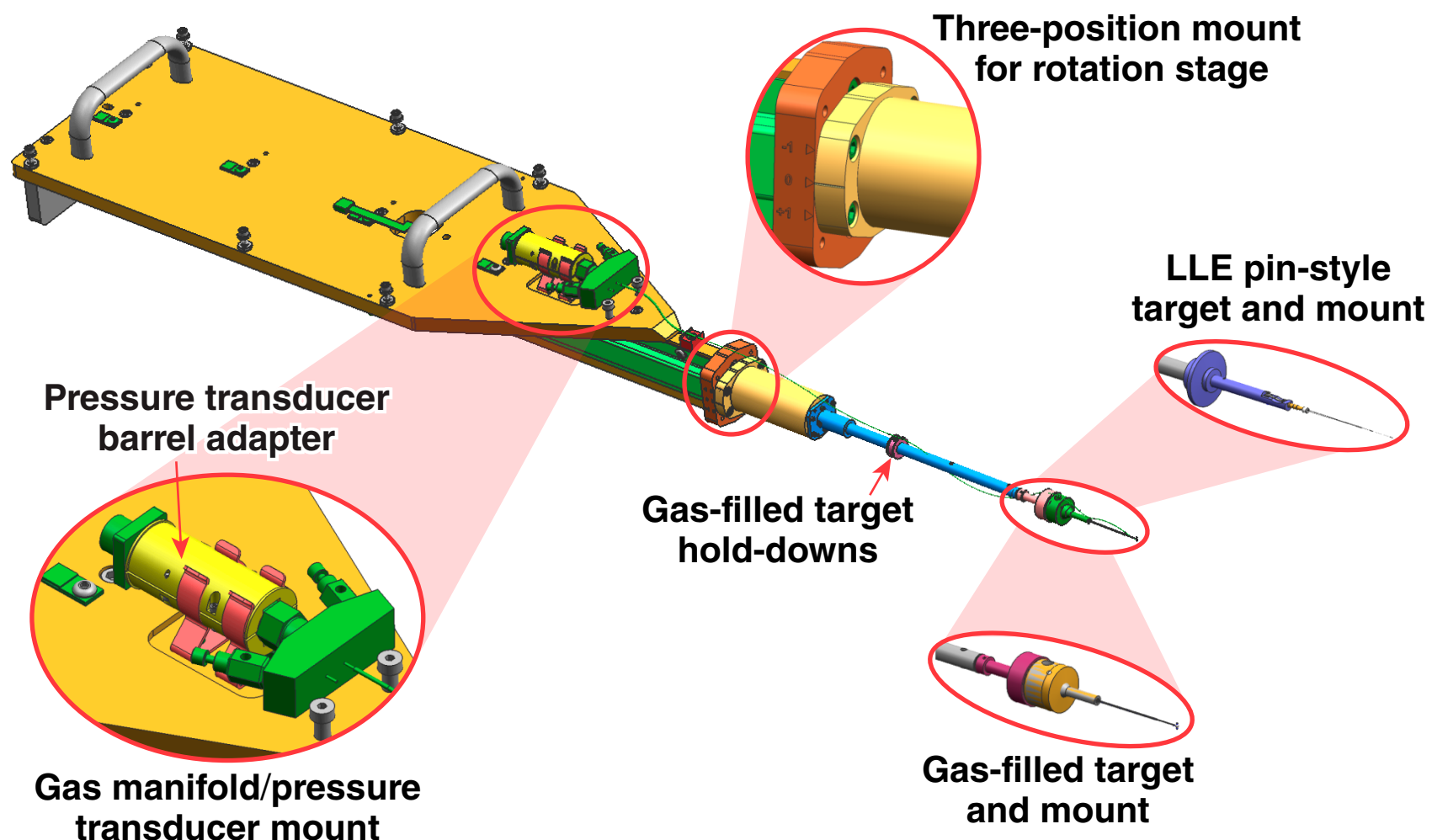


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Photocathode	Vertical with 0° Dove Prism Rotation $\pm 90^\circ$ possible in 1° increments
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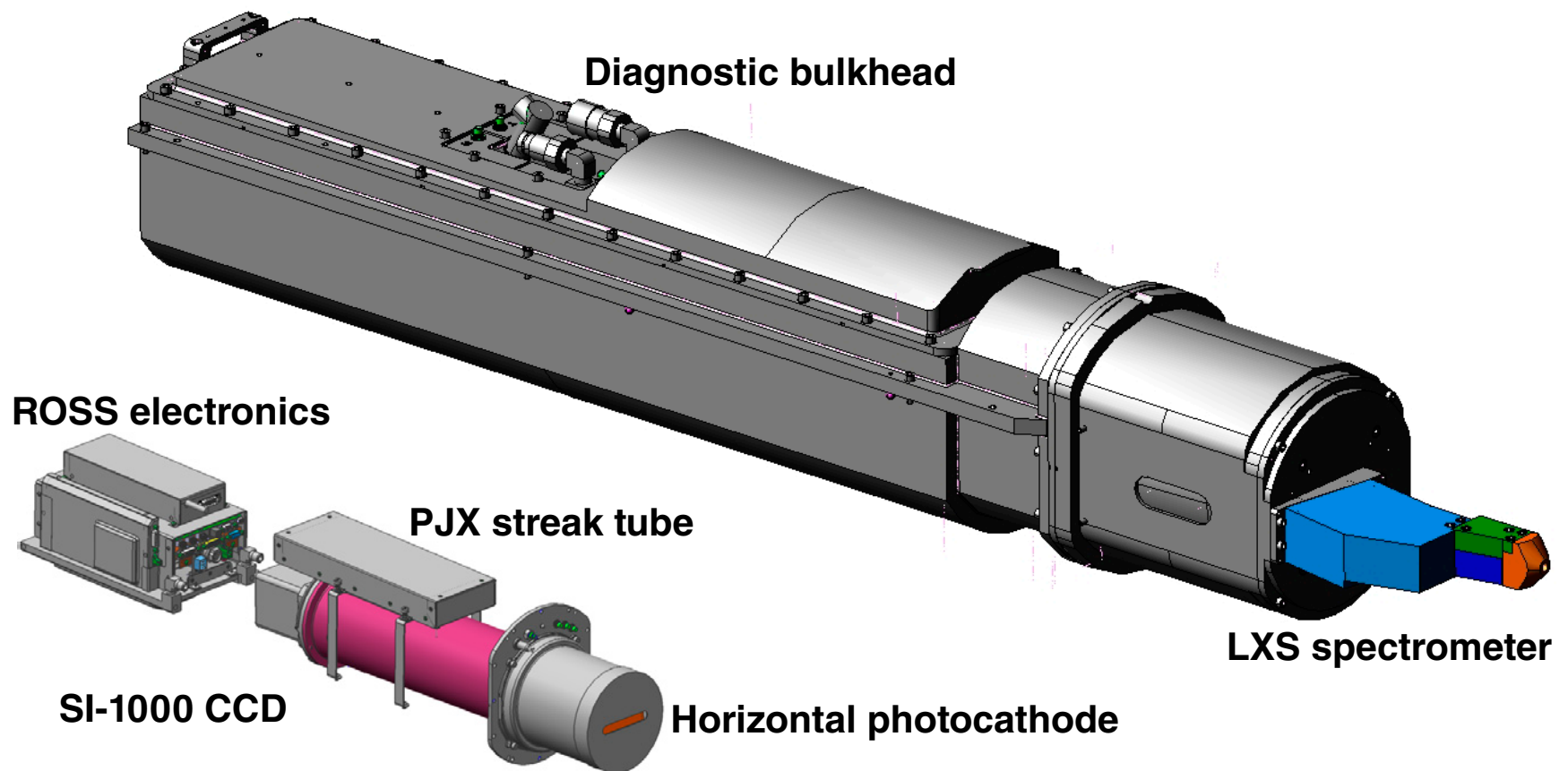


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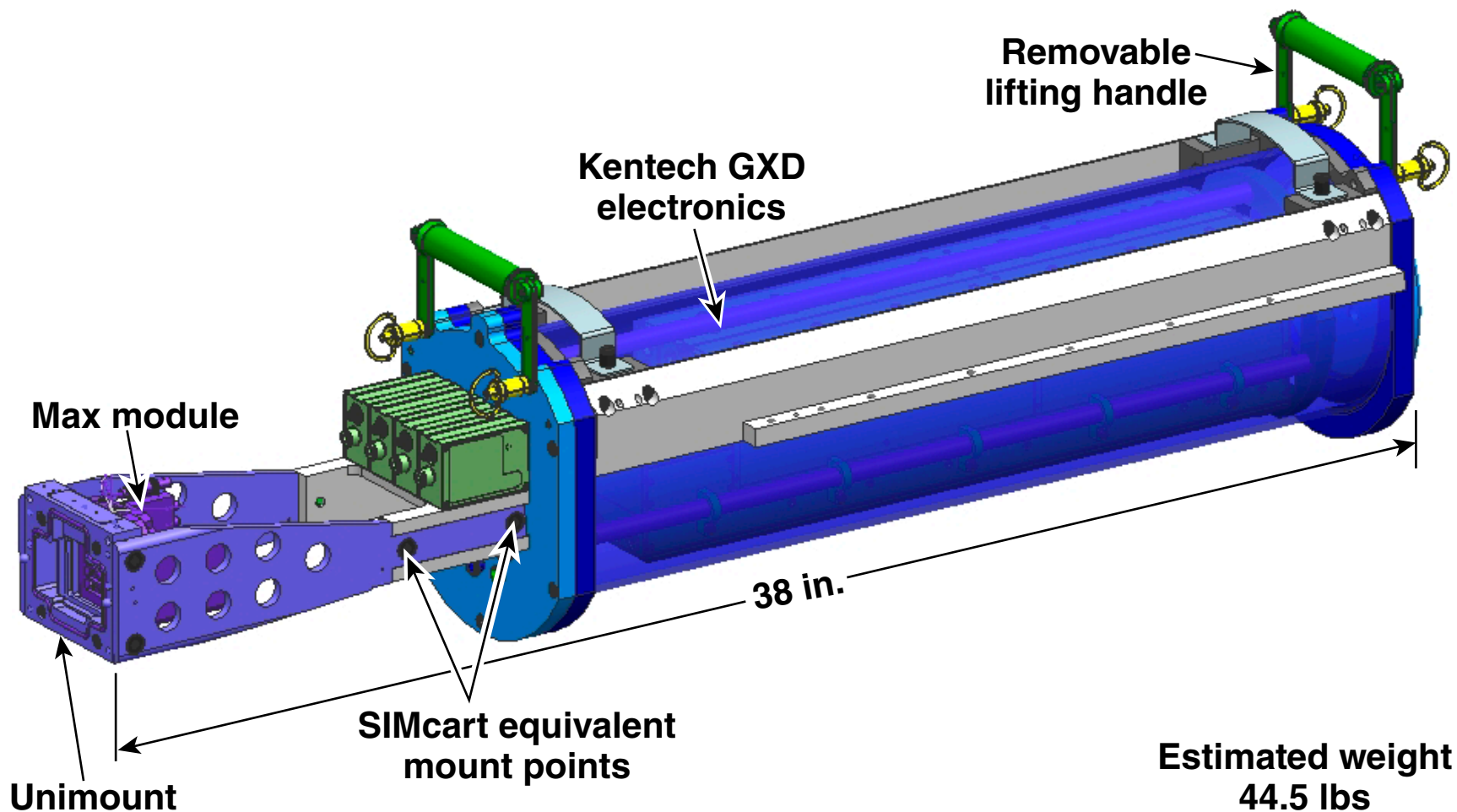
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Fiducial	4 ω fiducial available	None
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