TXI Breakout Session

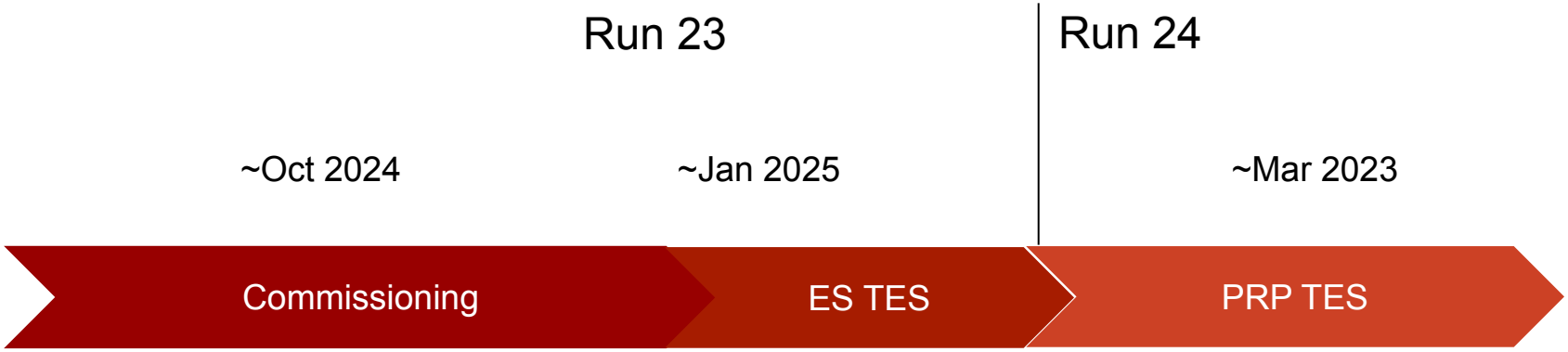
LCLS Run 23 Users Town Hall

January 30th 2024

SLAC NATIONAL ACCELERATOR LABORATORY

Stanford University | U.S. DEPARTMENT OF ENERGY

TXI Instrument: Notional timeline

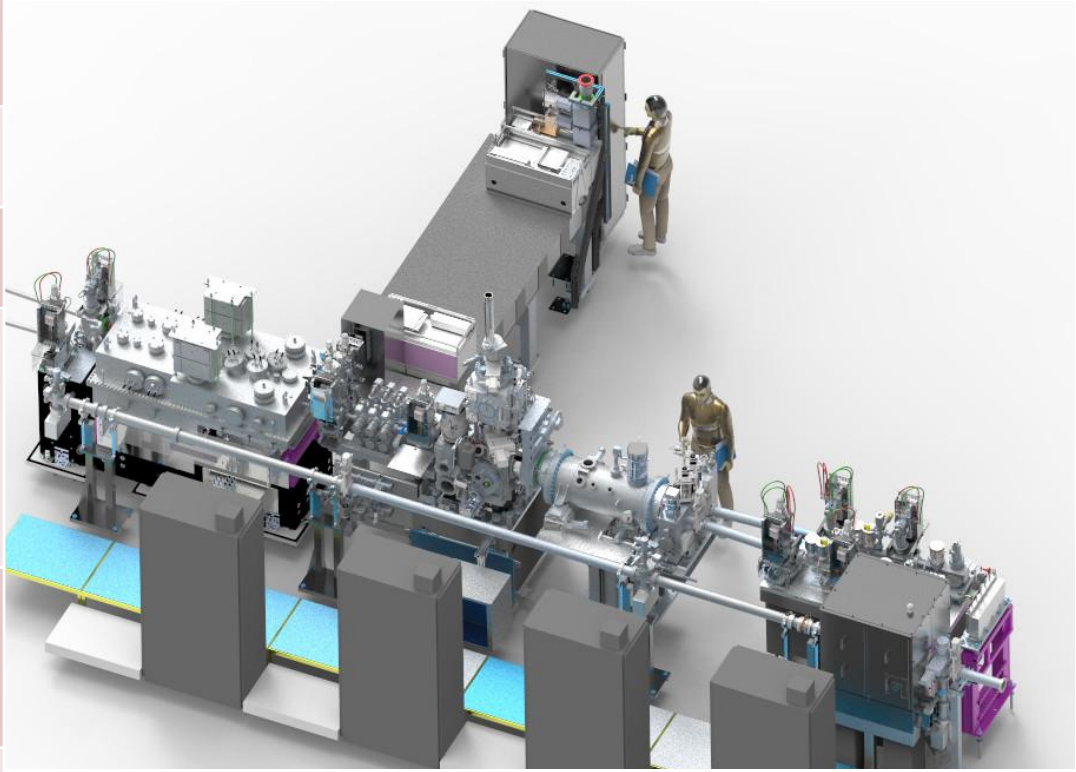


Users involvement in Early Science, 2-page summary:

- What is the science case?
- Why is LCLS needed?
- Crucial performance parameters:
  - X-ray energy, scanning
  - Optical wavelength, timing
  - Detectors, diagnostics, sample, etc.
- How many shifts are needed? Signal levels?
- Who needs to participate and what can they contribute?
- Is there theoretical support, what would make the experiment a “success”?

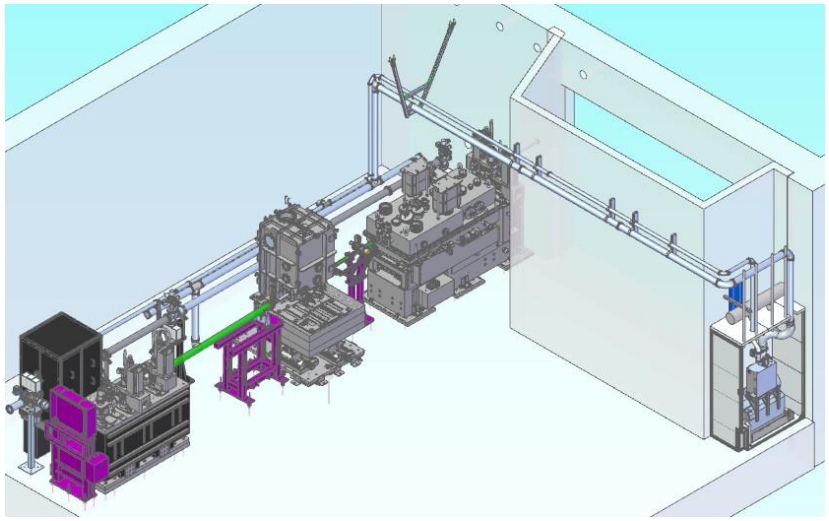
TXI Instrument Parameters: Tender Emission spectroscopy

Parameter	Requirement
Photon Energy Range [eV]	2000- 5000
Focal spot size [μm diameter FWHM]	<1 to 10
Pulse Fluence [μJ]	>100
Detector Repetition rate [kHz] Detector Pixel Size [μm] Detector: # of pixels Dynamic Range [photons] Ability to count photon at [keV]	>5 100 x 100 288 x 384 (110 kpix) 10,000 (@ 4 keV) >2 keV
Sample Delivery Methods	Liquid jets & sheets Fixed targets (slow scan)
Sample Environment	1 atm He
Diagnostics	On axis and perpendicular imaging I0 and beam imaging

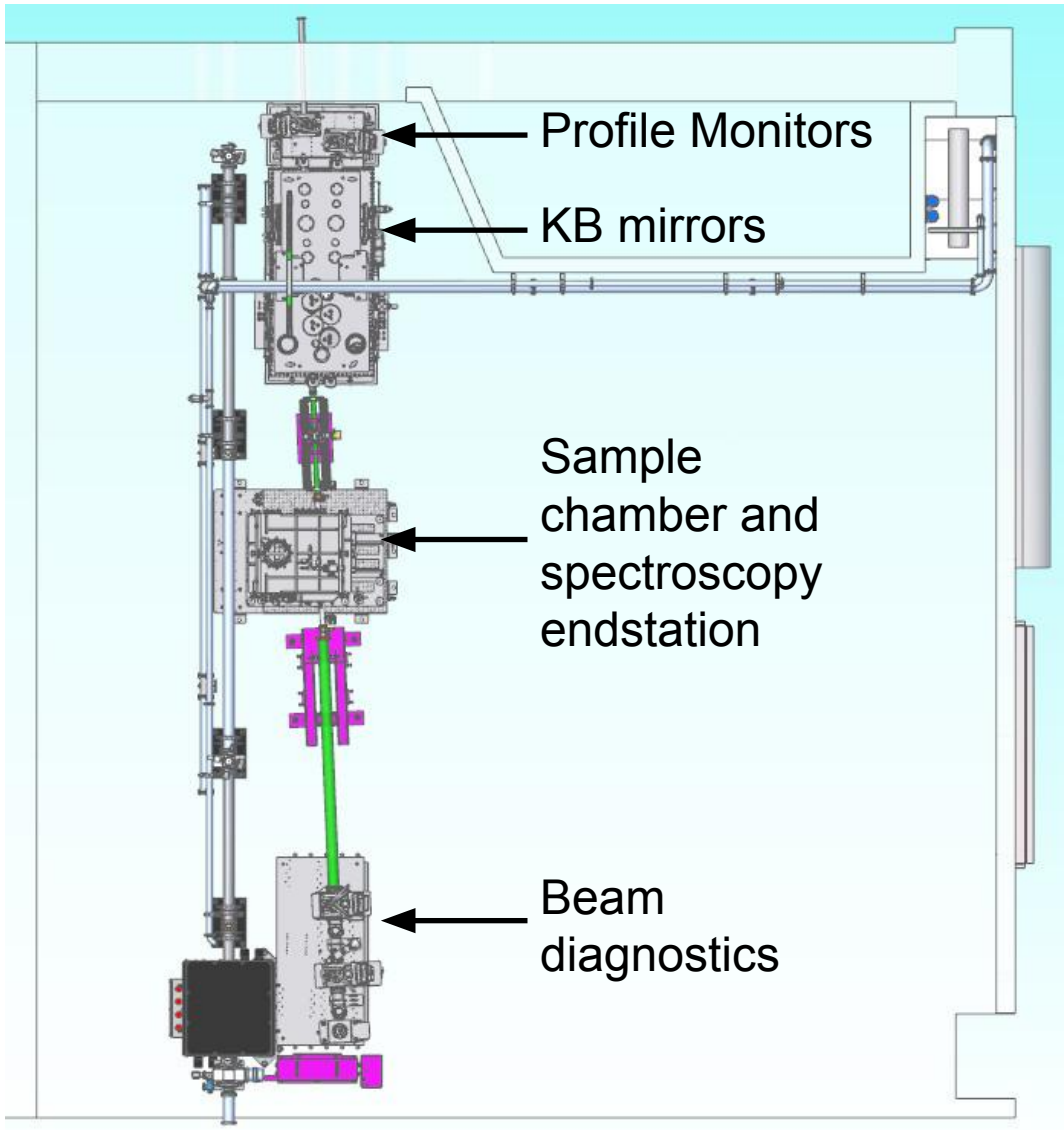


Note: $LiNbO_3$ crystal von Hamos spectrometer will be on a vacuum box.

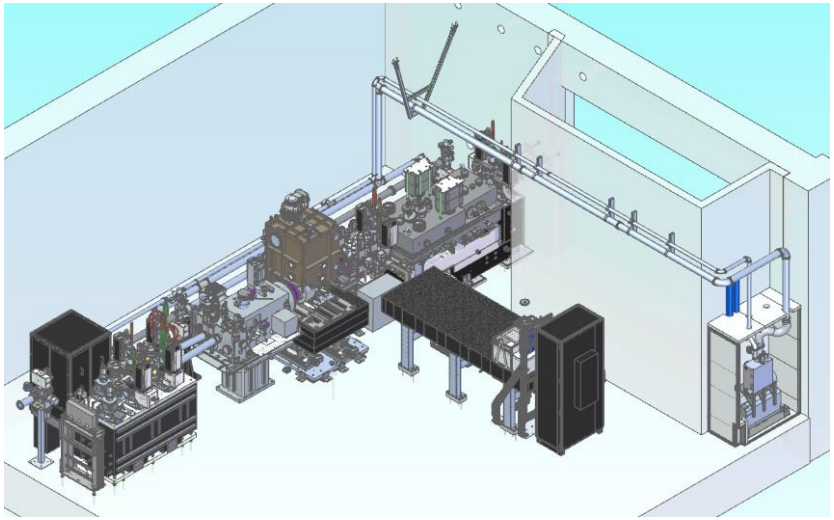
TXI Instrument: Initial Tender Spectroscopy Endstation Setup



Planned setup for commissioning during run 23



TXI Instrument: Tender Spectroscopy Endstation Setup with Laser



Planned laser pump installation during winter 2024