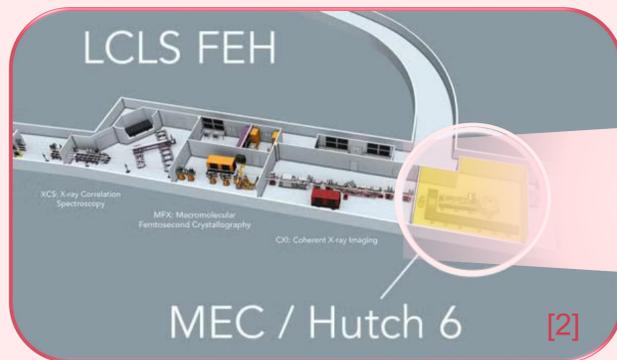




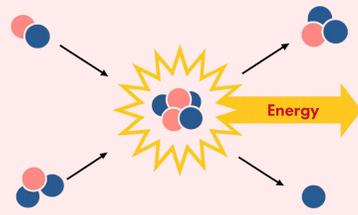
## Introduction

**Matter in Extreme Conditions (MEC)** uses high-power lasers and the LCLS hard x-ray beamline to probe how matter behaves under intense temperature, pressure, and energy density [1].



### Science Goals?

- Fusion Energy
- Lab Astrophysics
- Extreme Materials
- Plasma Sciences
- Warm Dense Matter



## CAD Visualization of MEC Experimental Hutch

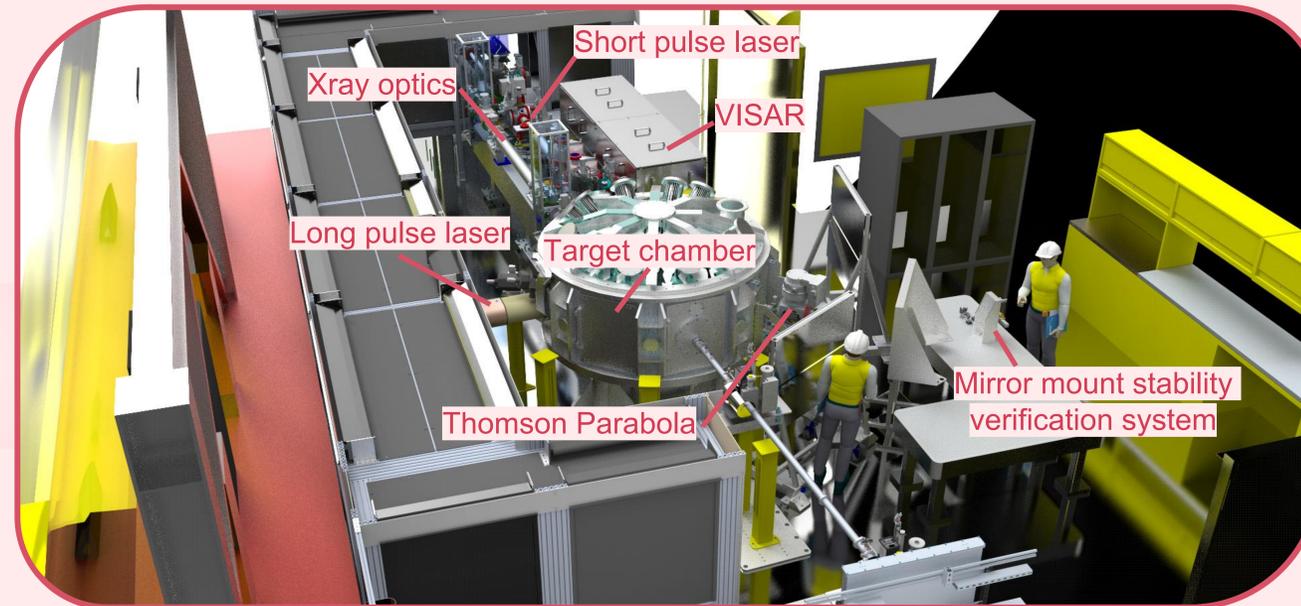


Figure 1: Aerial view of MEC hutch indicating diagnostic systems used

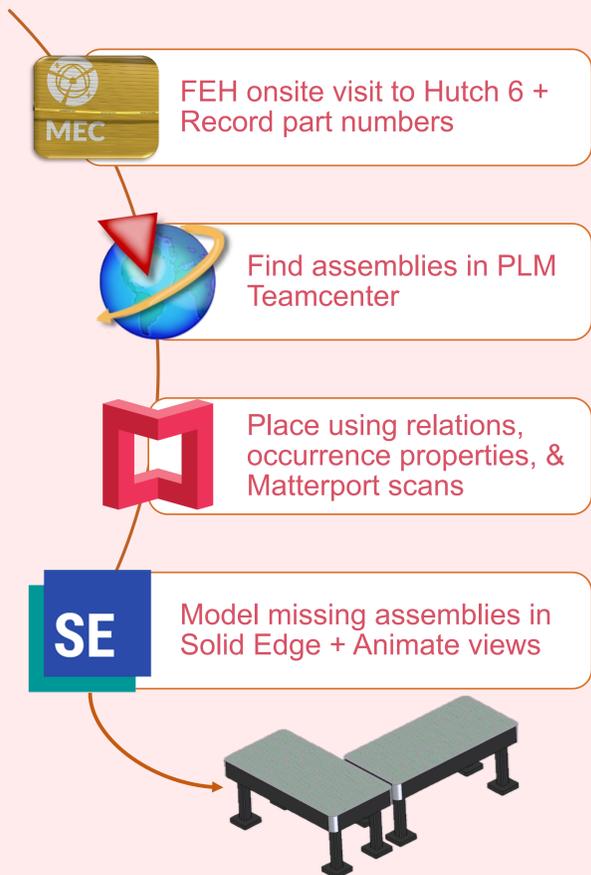
### Future Work

- Animate LCLS from sector 0 to FEH
- Model internals of long and short pulse laser enclosures

### Impact

- Technically accurate rendering of the MEC facility
- Enhances design reviews, outreach, and internal planning
- Aids scientific collaborators in understanding complex systems
- Makes current designs accessible to broader audiences

## Methodology



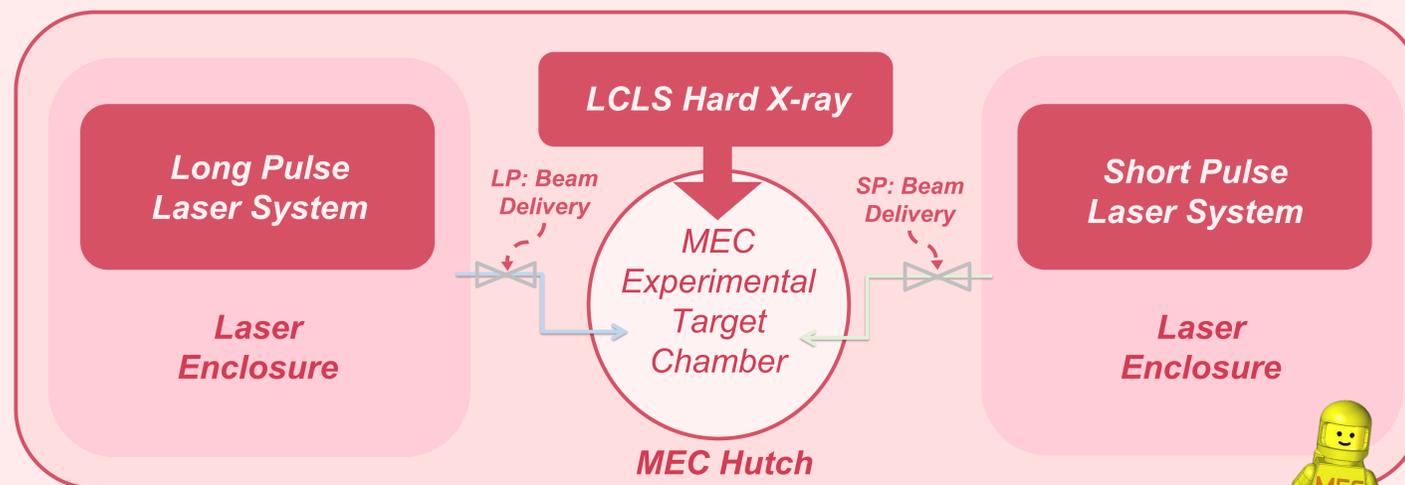
## Project Objectives

Rendering of MEC Hutch



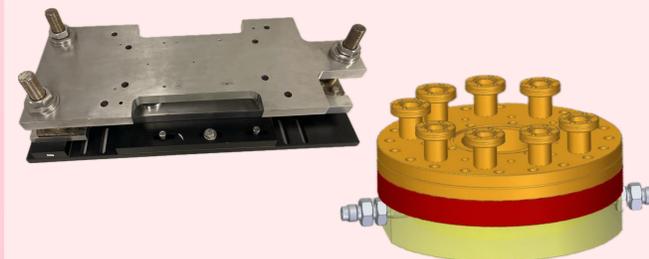
- Understand MEC layout & components
- Animate beam paths, diagnostics, & experimental configurations
- Collaborate with scientists and engineers for accuracy

## MEC Block Diagram



## Side Projects

- ★ Thomson Parabola diagnostic alignment stage cleaning & assembly
- ★ MCP dry nitrogen storage design
- ★ SLAC makerspace 3D printing
- ★ Observing beamtime alignment



### Acknowledgements :

This work was supported by the LCLS internship program, led by Alan Fry at SLAC National Accelerator Laboratory. The project was completed under the guidance of Quinn Claussen. Special thanks to Arturo Garcia, the LCLS internship coordinator, the MEC Instrument Team, and Ammara Hussain whose mirror mount CAD project was incorporated into the model.

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- [1] Nagler, B., Arnold, B., Bouchard, G., Boyce, R. F., Boyce, R. M., Callen, A., Campbell, M., Curiel, R., Galtier, E., Garofoli, J., Granados, E., Hastings, J., Hays, G., Heimann, P., Lee, R. W., Milathianaki, D., Plummer, L., Schropp, A., Wallace, A., Welch, M., White, W., Xing, Z., Yin, J., Young, J., Zastra, U., & Lee, H. J. (2015). The Matter in Extreme Conditions instrument at the Linac Coherent Light Source. *Journal of Synchrotron Radiation*, 22(3), 520–525. <https://doi.org/10.1107/S1600577515004865>.
- [2] SLAC National Accelerator Laboratory. (n.d.). Matter in Extreme Conditions (MEC) Instrument Specifications. LCLS. <https://lcls.slac.stanford.edu/instruments/mec/specifications>

Animation QR Code

