

TMO - A new soft X-ray beamline at LCLS II

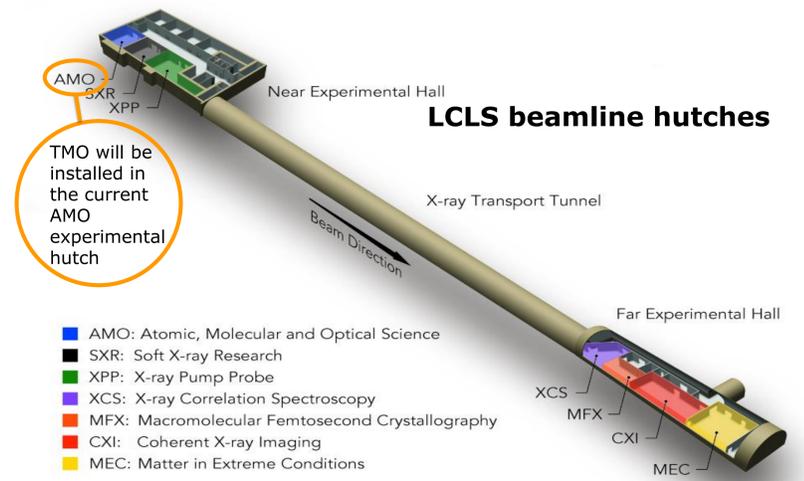
JC Castagna, L. Amores, M. Holmes, J. James, T. Osipov, P. Walter

Acknowledgments:

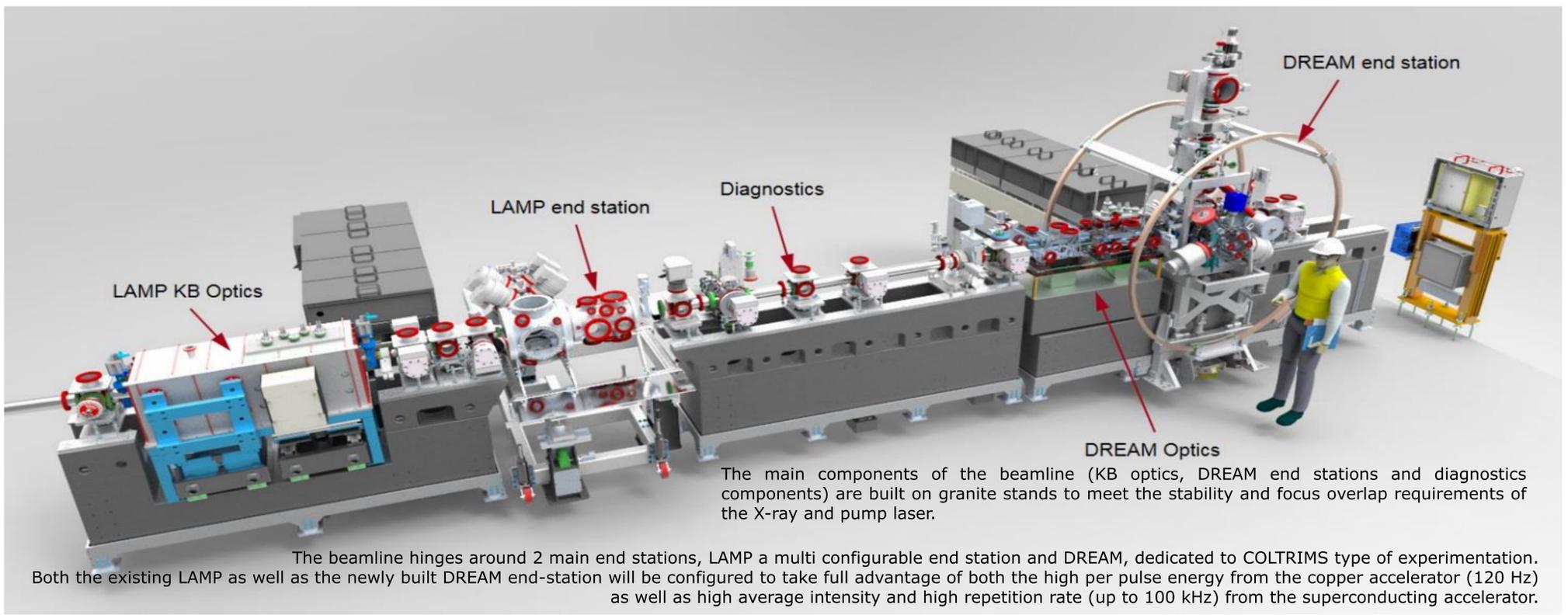
Georg Gassner, Lin Zhang, Daniele Cocco, Danny Morton

LCLS is building a set of 4 new soft X-ray beamlines to take the advantage of LCLS-II upgrade with high repetition rate and new undulators. The TMO (Time resolved Molecular Optical science) beamline also known as NEH 1.1 will support many experimental techniques not currently available at LCLS.

First light on TMO is expected in February 2020

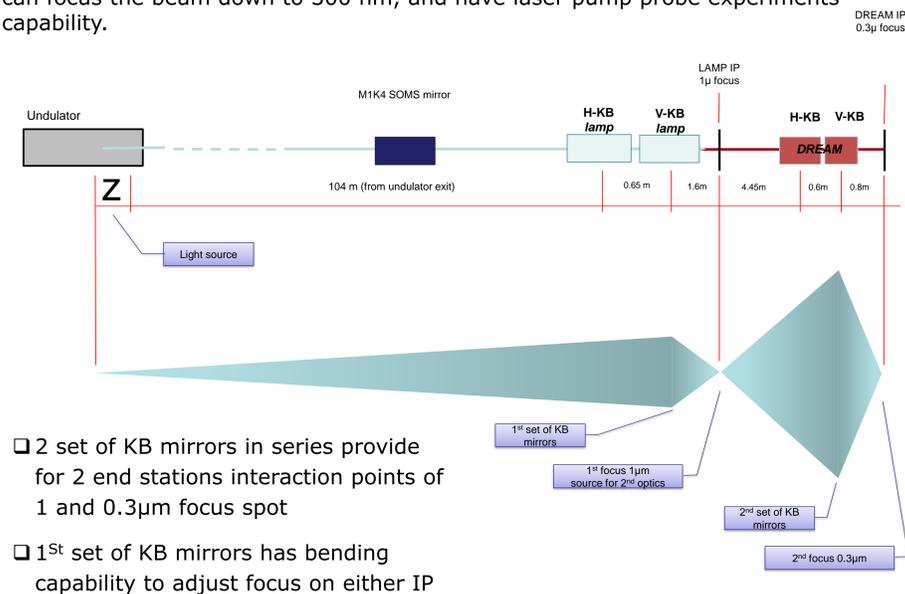


TMO beamline layout and End Stations

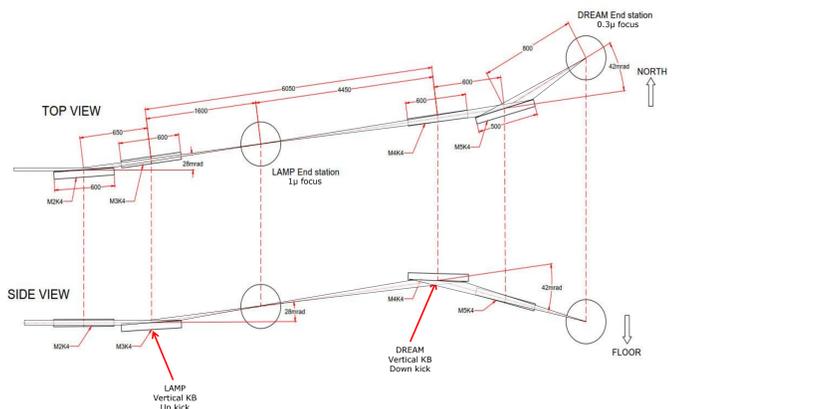


TMO optic systems

Each end station will have its own focusing optic systems (KB Mirrors) which can focus the beam down to 300 nm, and have laser pump probe experiments capability.

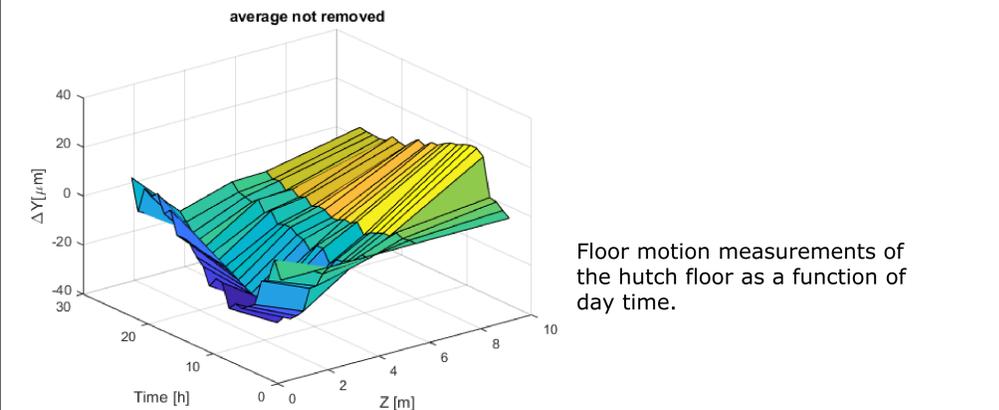


- 2 set of KB mirrors in series provide for 2 end stations interaction points of 1 and 0.3µm focus spot
- 1st set of KB mirrors has bending capability to adjust focus on either IP



Building thermal stability

The thermal stability of the building itself has a direct impact on beam stability. External shifts of temperature have directly been measured as floor deviation in the sub-basement of the building where the beamline is installed. Variations of up to 30µ have been measured on the floor flatness and horizontality. In order to meet our very demanding requirements the part of the building that is directly exposed to climate and solar radiation is being thermally insulated to reduce thermal expansion



Floor motion measurements of the hutch floor as a function of day time.

Vacuum profile



The large range of vacuum pressure used in the 2 main end stations requires sophisticated pumping options and numerous differential pumping systems between the essential elements of the beam-line. The LAMP end station will work at levels of up to 10⁻⁵ torr, while the DREAM end station will continuously work in the low 10⁻¹¹ torr range.