

# **Matter in Extreme Conditions instrument (MECi)**

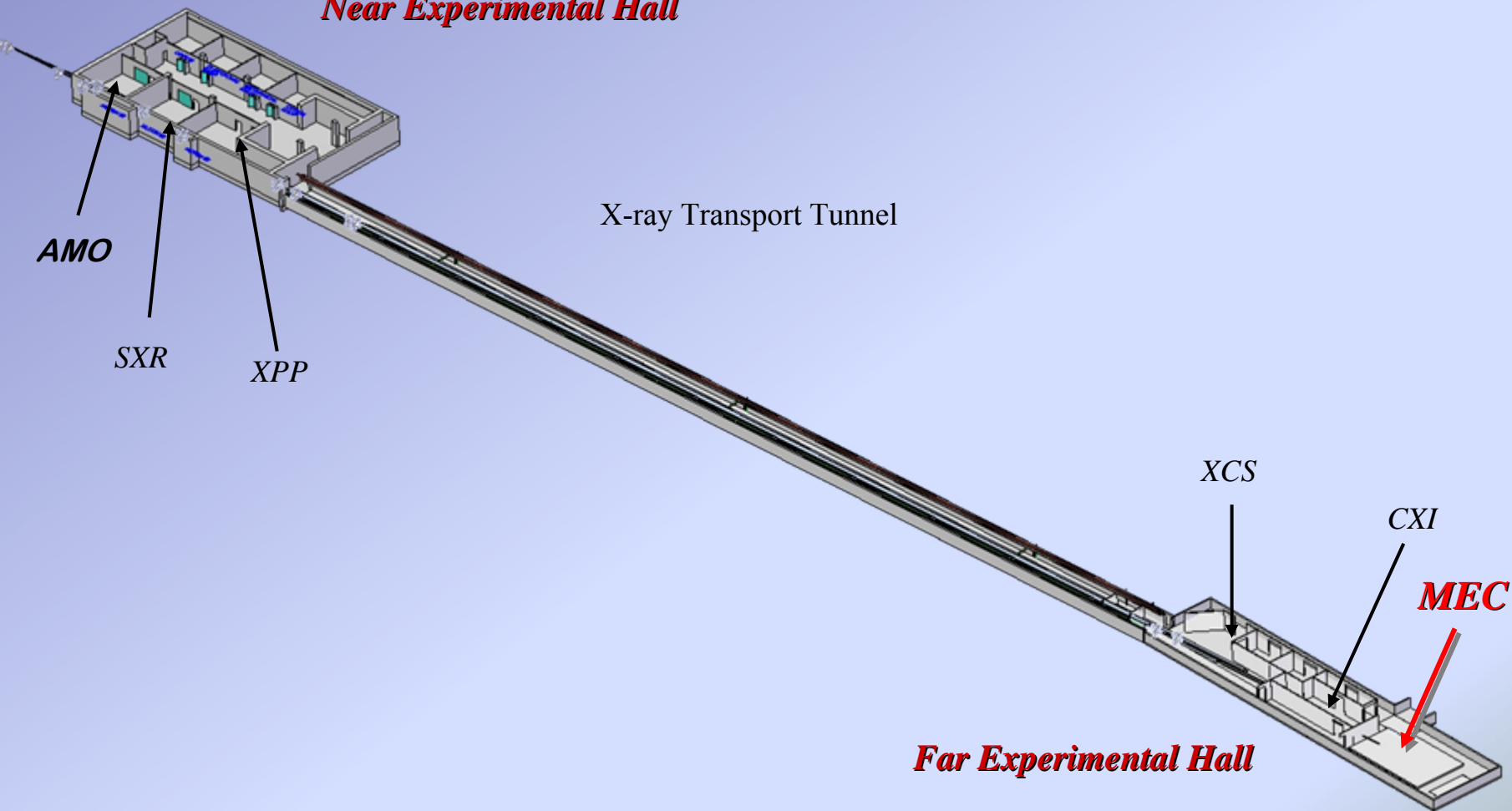
- LCLS parameters
- Layout
- X-ray optics
- Lasers systems
- Baseline component summary

# *LCLS Beam parameters for MECi*

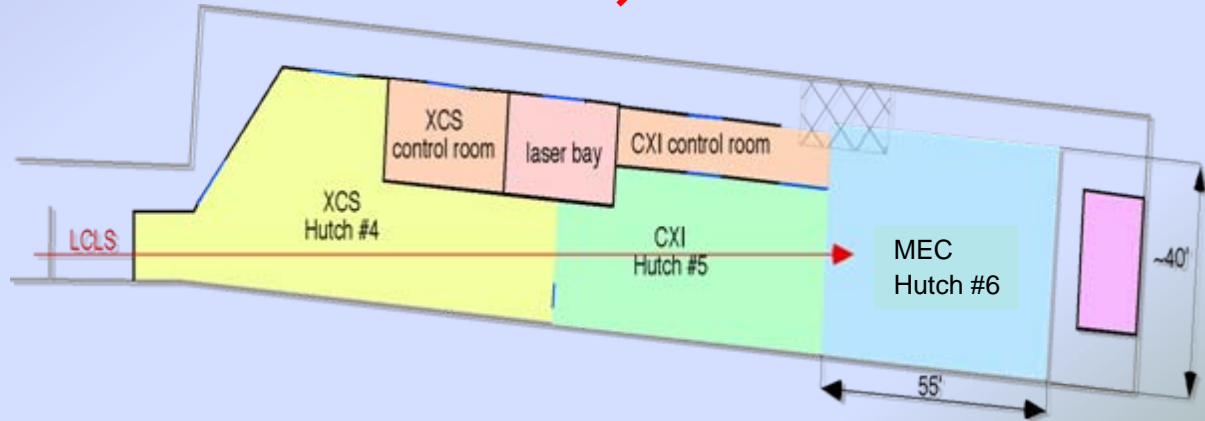
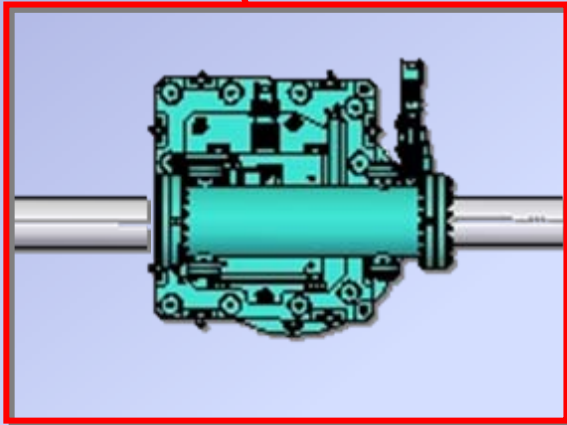
- Energy range (1<sup>st</sup> harmonic) 0.8-8 keV
  - Note: 3<sup>rd</sup> harmonic available, some loss at low energy
- Angular divergence: 1-10  $\mu\text{rad}$  (8-0.8 keV)
- Unfocussed spot size: 0.4-4 mm (8-0.8 keV)
- Energy per pulse:  $\sim 1\text{mJ}$  ( $1 \times 10^{12}$  photons @ 8 keV)
- Pulse length 100 fsec

# LCLS Experimental Halls

*Near Experimental Hall*



# *MECi Layout*

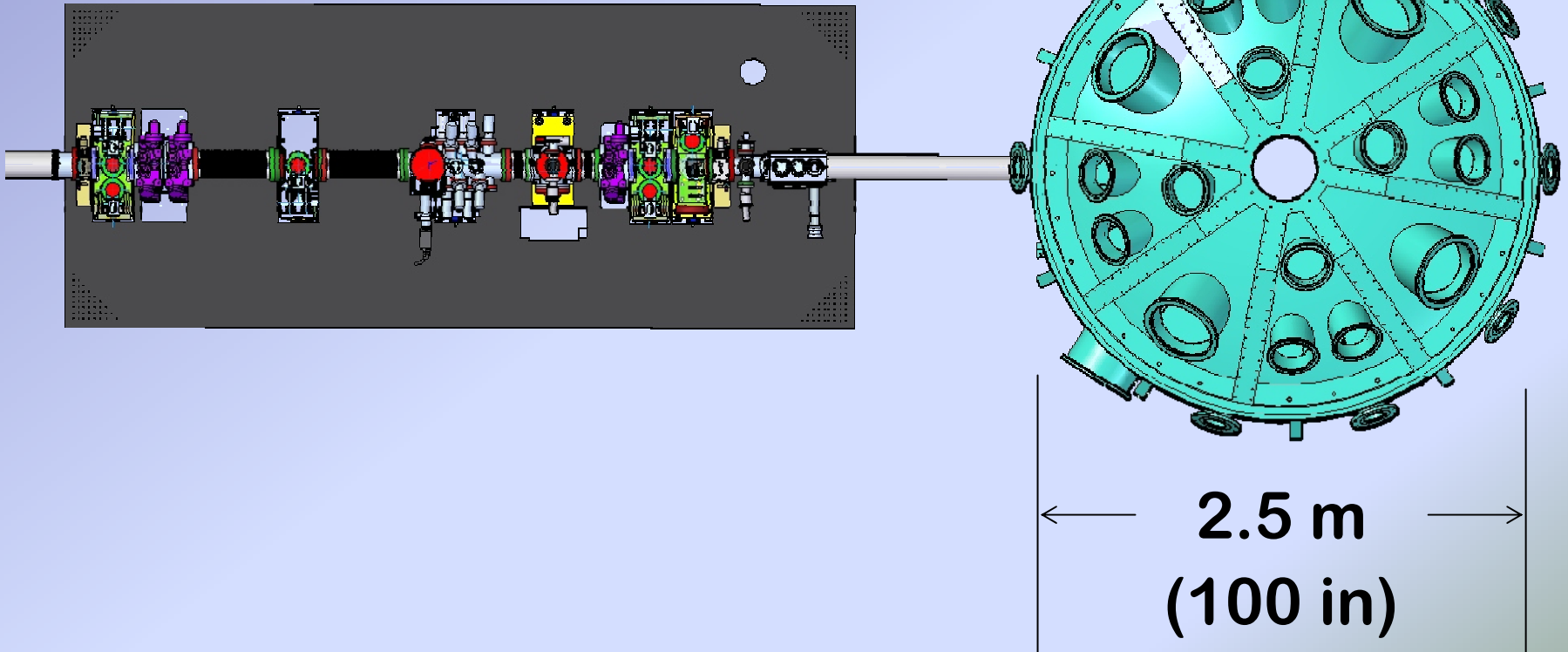


# *MECi hutch layout details*

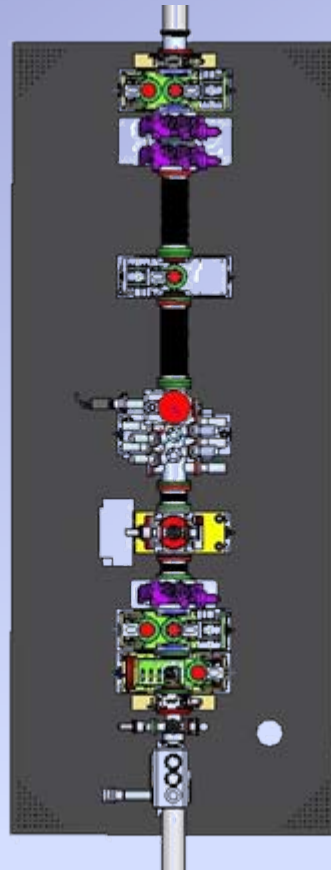
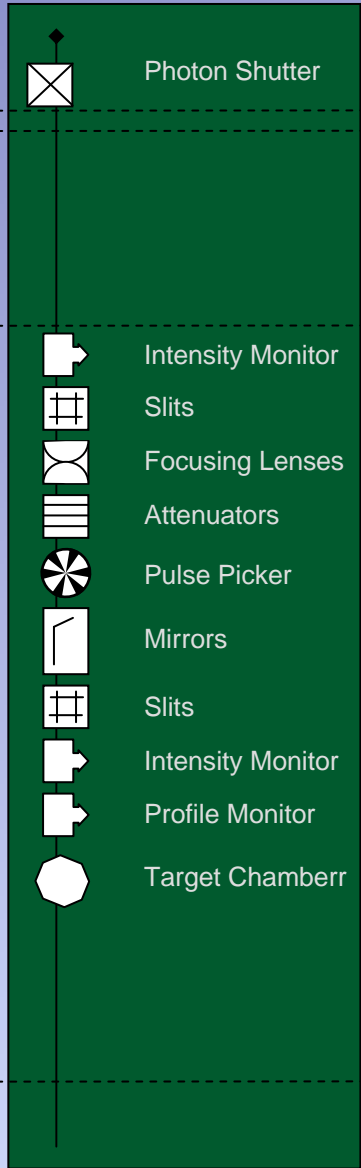
*(plan view)*

*X-ray Optics*

*Target Chamber*

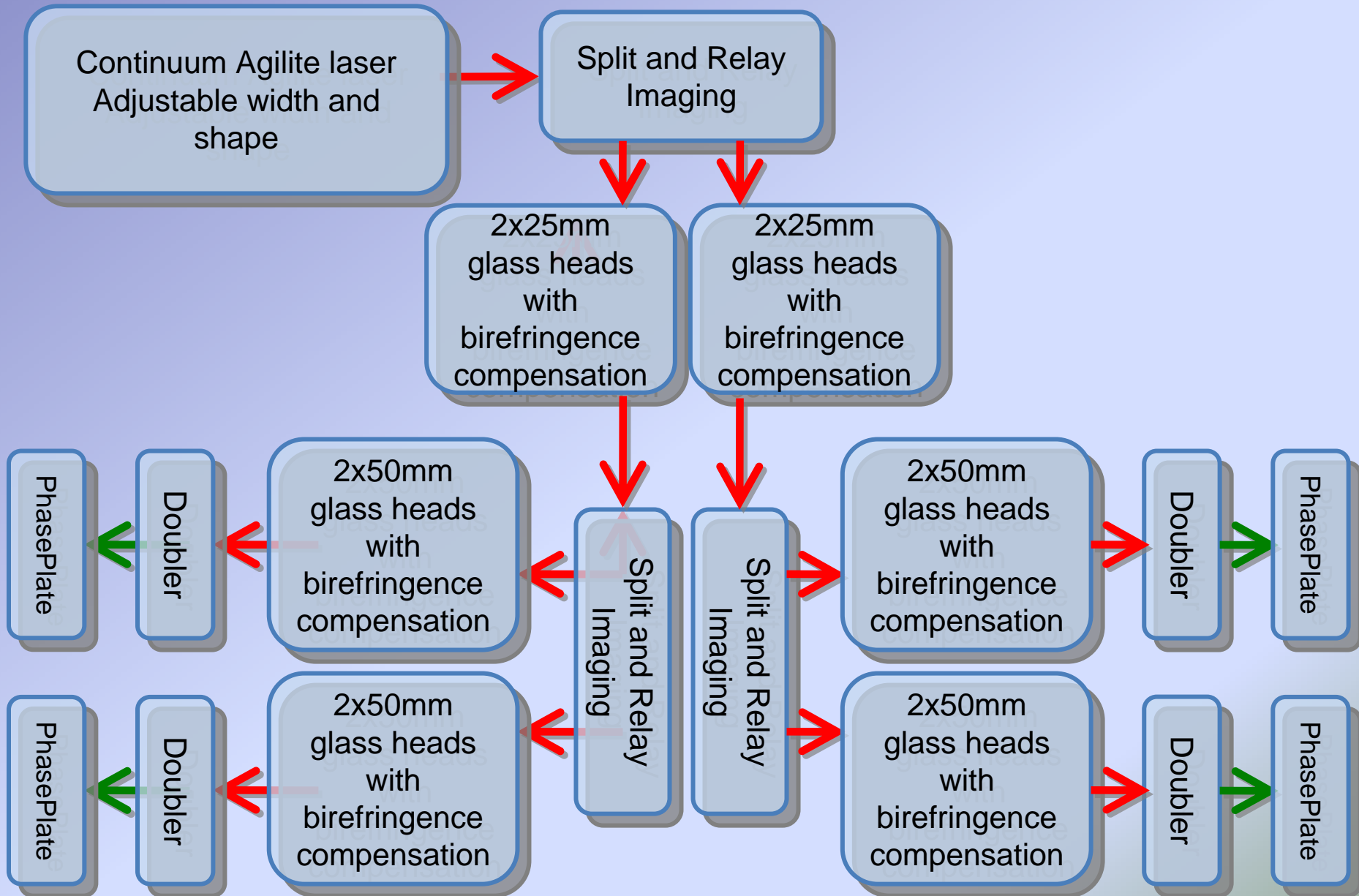


# MECi X-ray Optics

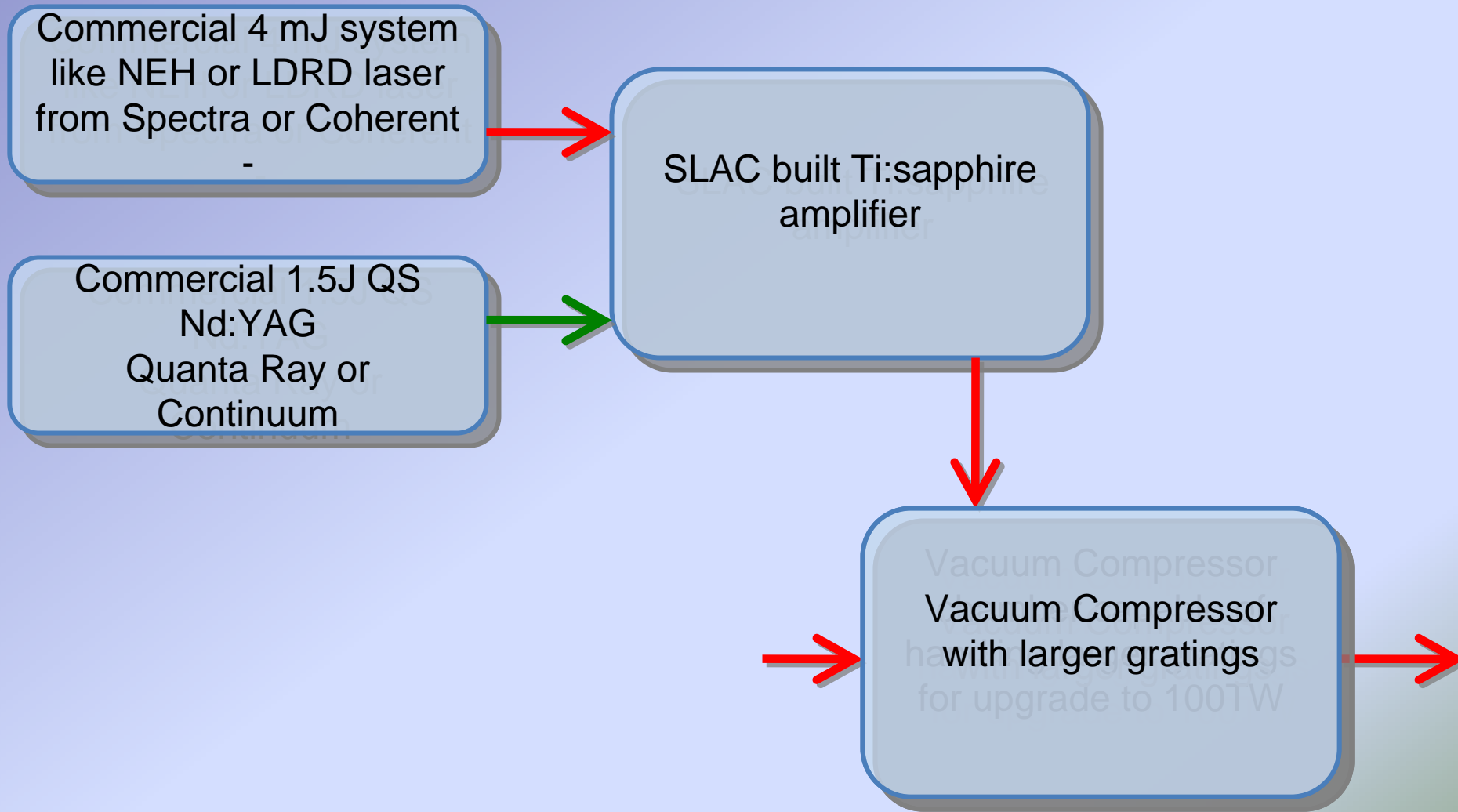


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Tailor X-ray spatial profile ( > 50 microns )	X-ray Slits
Tailor X-ray spatial profile ( < 50 microns )	X-ray Focusing Lenses
Tailor X-ray intensity and spectrum	Attenuators
Tailor X-ray repetition rate	Pulse Picker
Tailor X-ray spectrum	Harmonic Rejection Mirrors
Characterize X-ray pulse intensity	Intensity Monitor
Characterize X-ray spatial profile	Profile Monitor

# 4x30 J, 532nm ns laser



# 150 mJ, 35 fs laser





# ***MECI Baseline Components***

- X-ray transport, x-ray optics (including focusing), x-ray diagnostics
- Laser systems
  - 4 x 30 J Long Pulse
  - 150 mJ Short Pulse
- Target Chamber
- Target diagnostics
  - FDI
  - VISAR
  - Spectrometers – crystal and grating
  - Streak camera
- Data Acquisition and controls