

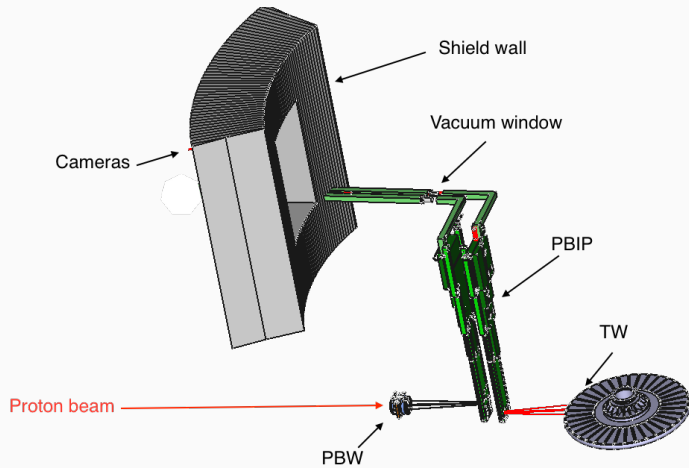
Target Optical Systems

Håvard Gjersdal

2017-10-23

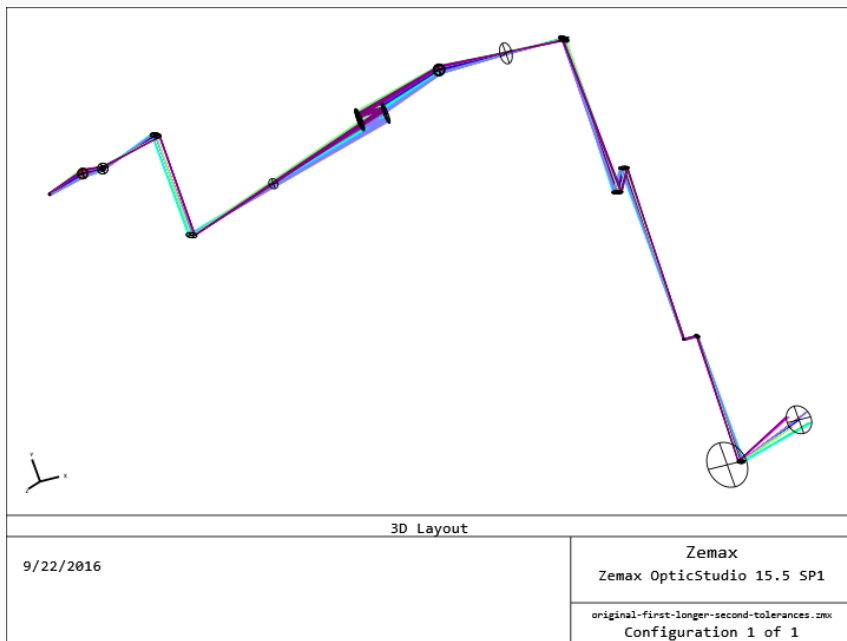
University of Oslo

Introduction

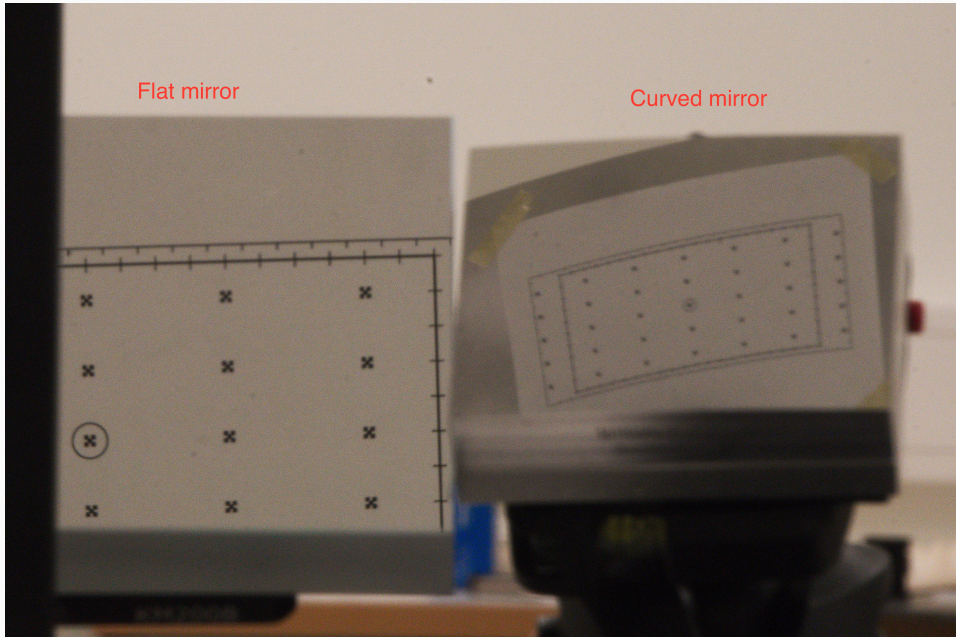


- Field of View: We must see the full beam window, and fiducials surrounding it
- Resolution: Better than one mm in object space
- Collect sufficient light for extracting beam information

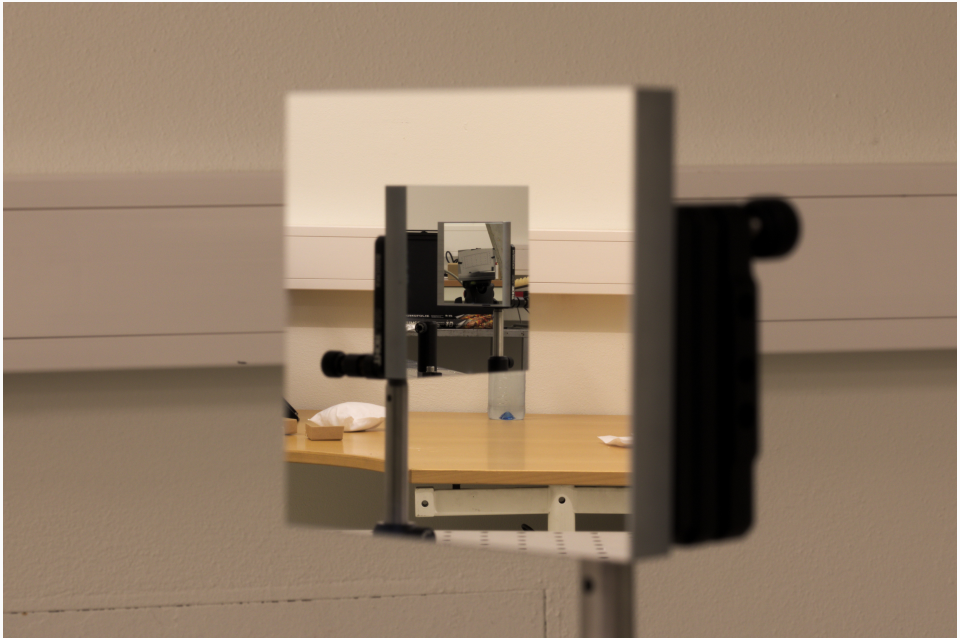
Optical system presented at PDR (Obsolete)



First mirror, only curved mirror

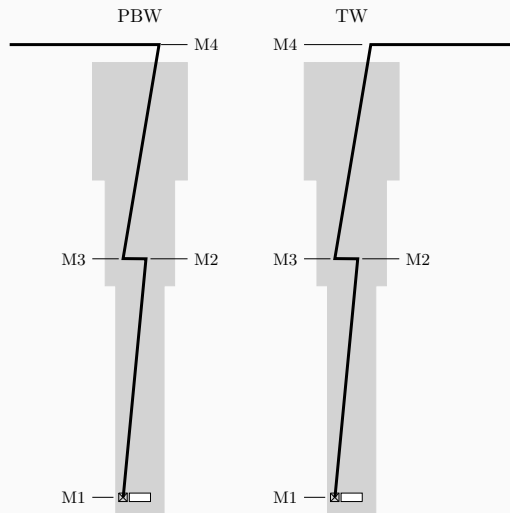
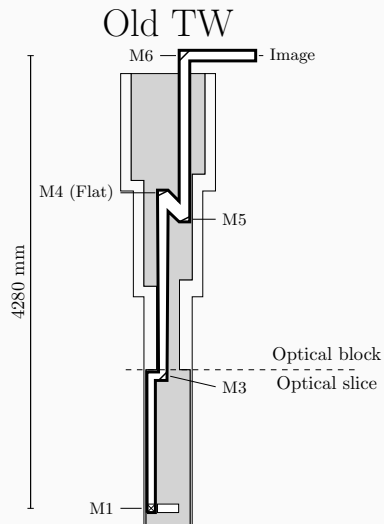


Flat mirrors

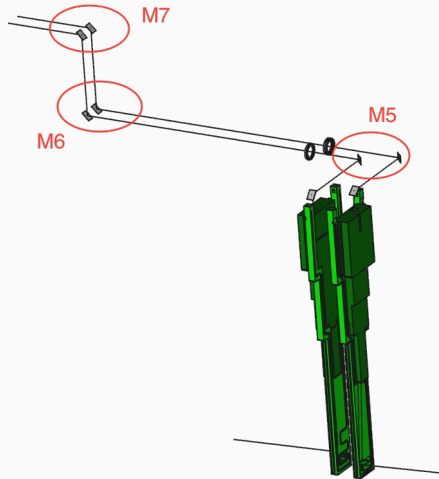




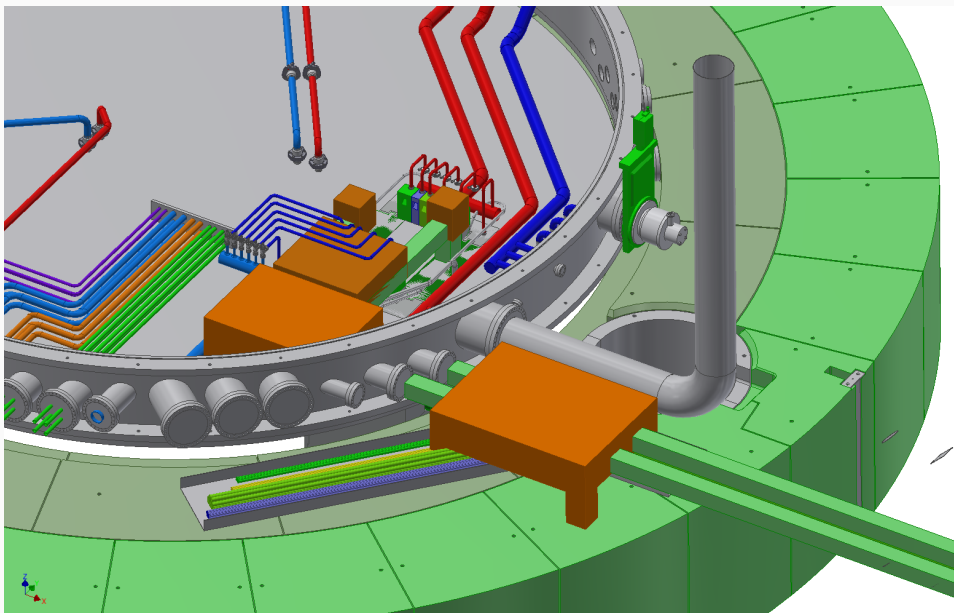
Optical path through PBIP



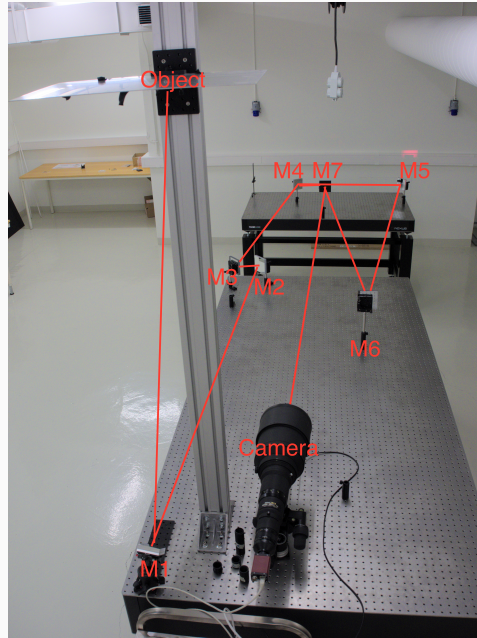
Full optical path



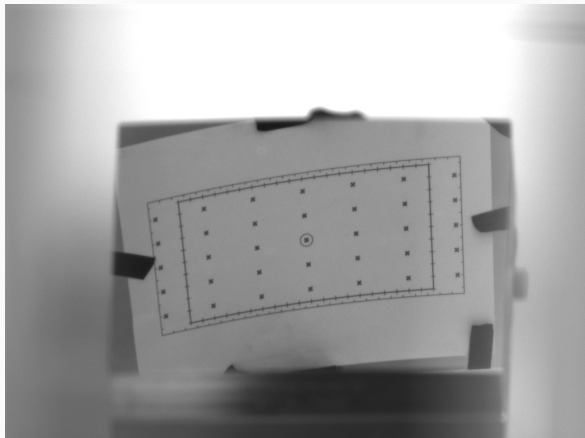
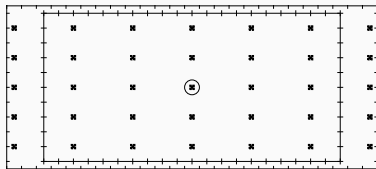
Mirrors above PBIP



Prototype

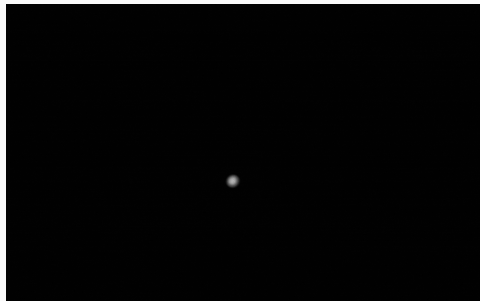
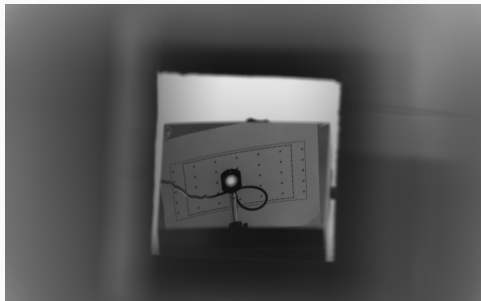


Prototype performance



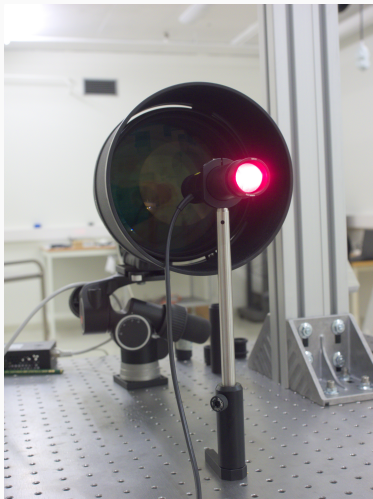
Prototype light collection

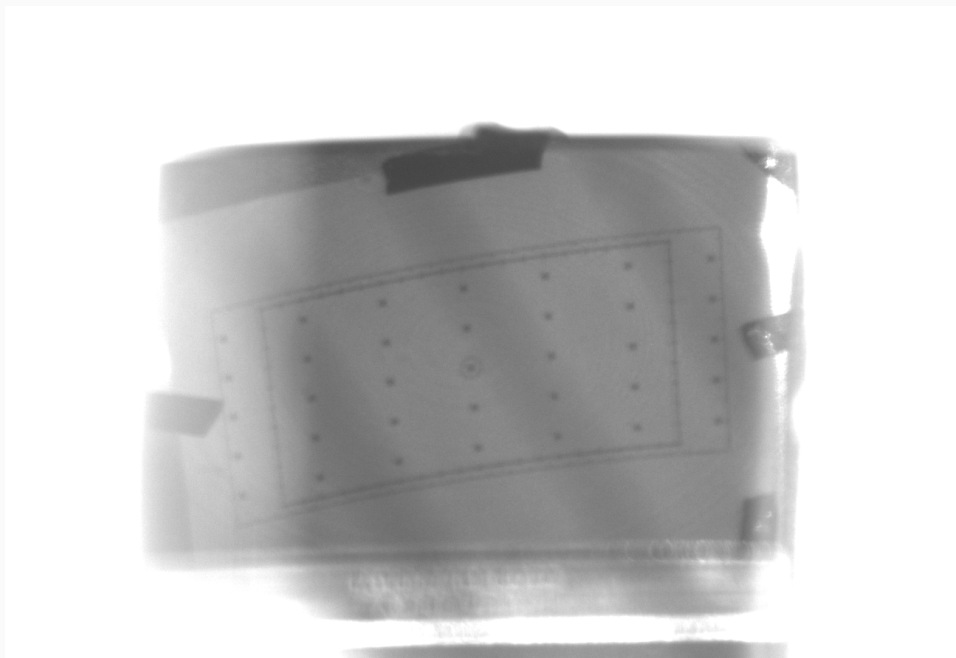
Light as bright as HV1 in 16MeV, 15 nA/cm²



Exposure time set to 7140 μ s, should correspond to less light on the sensor than a test pulse in ESS on fresh coating.

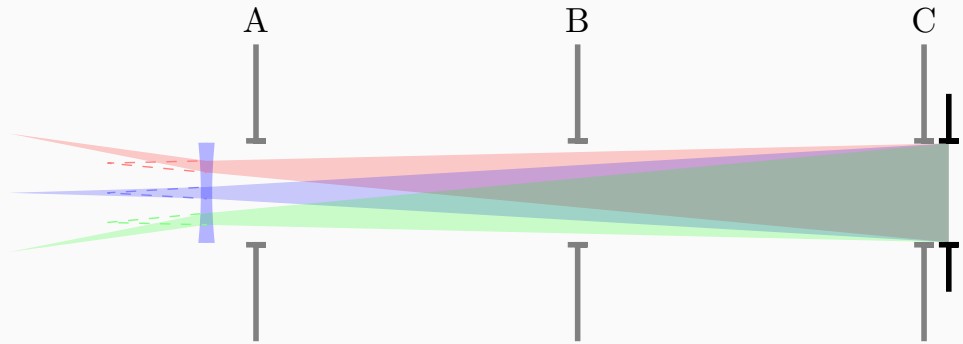
Illumination



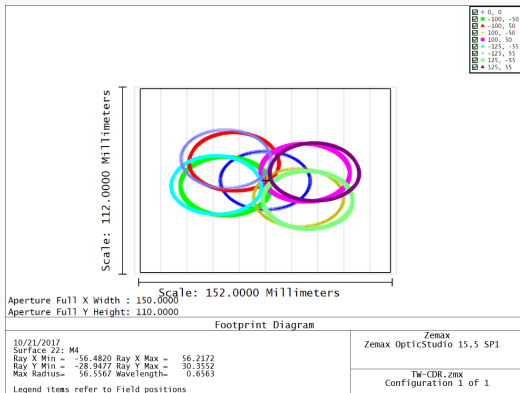
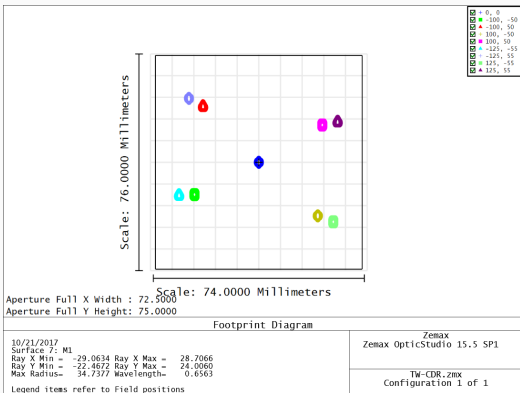


TOLERANCES

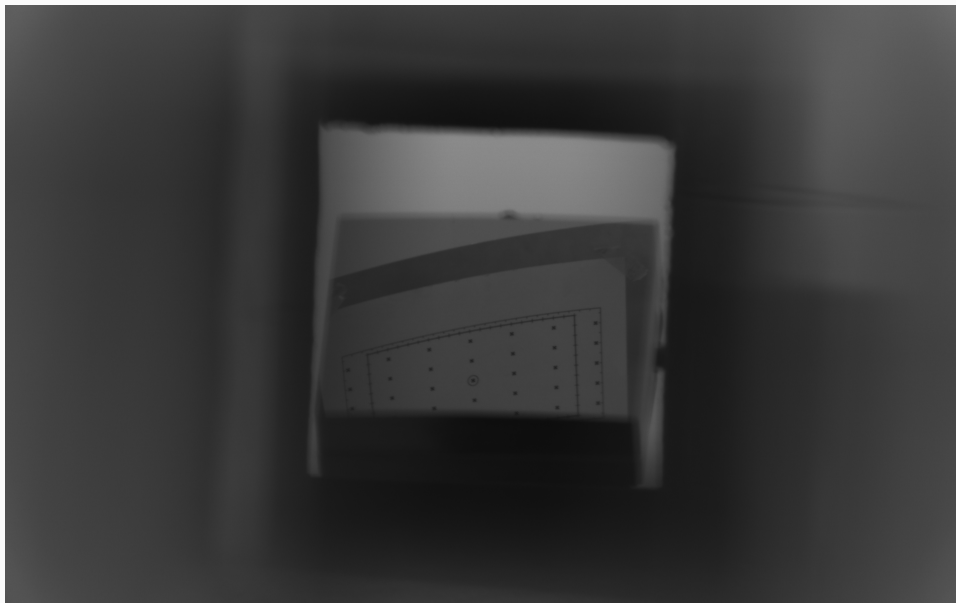
Loss of light



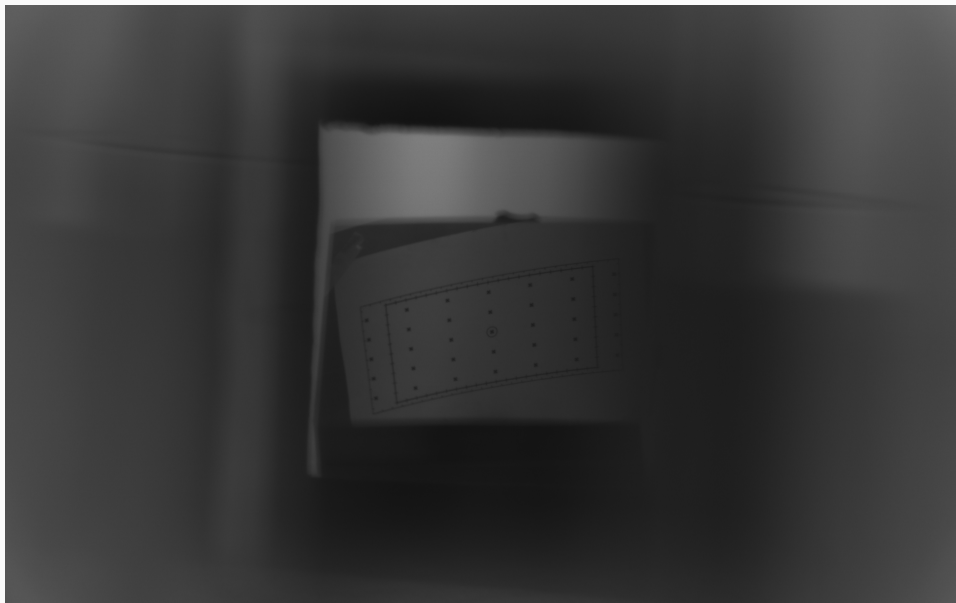
Error budget



Loss of field of view



Vignetting



	Translations			Rotations		
	X	Y	Z	X	Y	Z
M1	1 mm	1 mm	1 mm	0.3°	0.3°	0.3°
M2-M7	5 mm	5 mm	5 mm	0.3°	0.3°	0.3°

Installation of PBIP in Monolith

	Translations			Rotations		
	X	Y	Z	X	Y	Z
PBIP	5 mm	2 mm	2 mm	0.3°	0.3°	0.3°

	Translations			Rotations		
	X	Y	Z	X	Y	Z
M1	1.5 mm	1.5 mm	1.5 mm	0.3°	0.5°	0.5°
M2, M3	1 mm	1 mm	1 mm	0.06°	0.06°	0.06°
M4-M7	2 mm	2 mm	2 mm	0.06°	0.06°	0.06°

	Translations			Rotations		
	X	Y	Z	X	Y	Z
Thermal deformation to the interface	1 mm	1 mm	1 mm	0.3°	0.3°	0.3°
Thermal deformation of mirror/mount	0.1 mm	0.1 mm	0.1 mm	0.1°	0.1°	0.1°
Initial misalignment	0.4 mm	0.4 mm	0.4 mm	0.1°	0.1°	0.1°

Skal fikses

- We are in contact with Kugler for mirror manufacturing
- Lead time for approx 7 months for curved mirrors, less for flat mirrors.
- A full thermomechanical simulation for PBIP not done. If the tolerances cannot be met, we may need to redesign.
- Protective coating not yet determined. This must be done before we can order mirrors.
- Mirror mounts must be tested in the lab.
- M1 will be heated to relevant temperatures on the mount.

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