JGW-T2112592

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Summary of Current Situation of In-vacuum Steering Mirrors

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In-vac Steering Mirrors

- In-vac steering mirrors summarized in this document
  - Around MCF and IFI (REFL related)
    Handled by IOO
  - Around IMMT1 (ISS related)
    They are actually partially reflective mirrors (JGW-G2012232)
    Handled by SEO and ISS team
  - Around PR2 and SR2 (ALS related)
    Handled by MIF/GRE
  - Around OFI and OMC (AS RF, OMC REFL, OMC TRANS related)
    Handled by IOO

- Other in-vac steering mirrors not included in this document
  - TMS related
  - Pcal related
  …

Around MCF and IFI

- STM1,2 to steer beam to IFI and POM1,2 for REFL beam

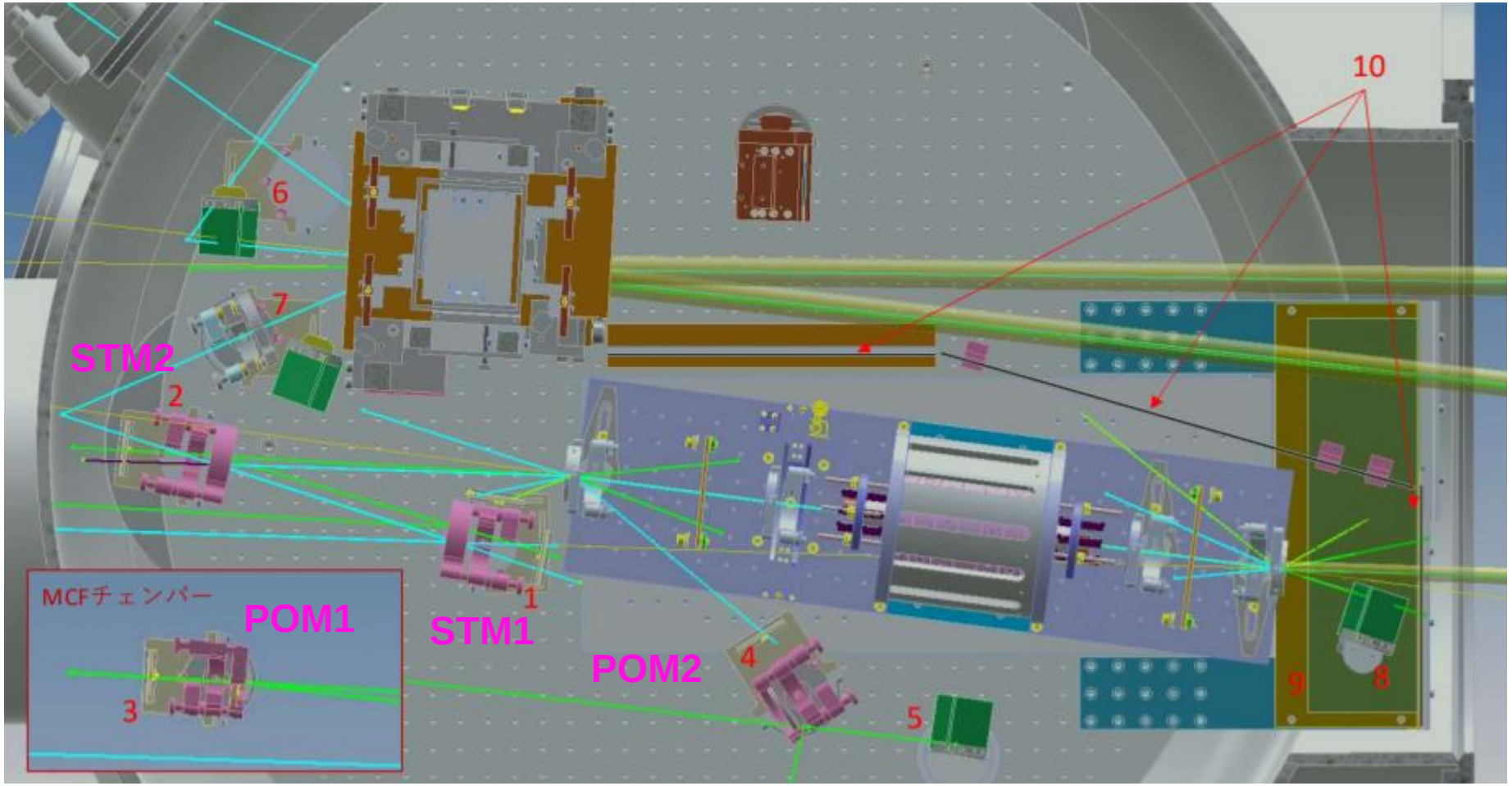


Figure from JGW-D2112527
See also JGW-T1706953

Around MCF and IFI

- Autex PYD-20 are used
  lambda/20 polished
  HR>99% for s-pol and p-pol at 0-45 deg
  AR coating ?

Name	Chamber	Wavelength	Polarization	Incident angle	Currently installed
STM1	IFI	1064 nm	S-pol (to MIF) P-pol (REFL)	8.06 deg 6.63 deg	PYD-20
STM2	IFI	1064 nm	S-pol (to MIF) P-pol (REFL)	8.06 deg 6.63 deg	PYD-20
POM1	MCF	1064 nm	P-pol (REFL)	1.71 deg	PYD-20
POM2	IFI	1064 nm	P-pol (REFL)	41.7 deg	PYD-20

Nominal beam height around IMC is 209.9mm.
Note that the height of IFI is 10 mm higher (219.9 mm).
Optics height of
- STM1 and 2 are 210.19 mm (JGW-D1504212)
- POM1 is 209.92 mm (JGW-D1504162)
- POM2 is 209.59 mm (JGW-D1504213)

From T. Akutsu
JGW-E2112952

Around IMMT1 (ISS related)

- ISS POM for splitting IMMT1 trans beam to ISS path and IMMT1T QPD path

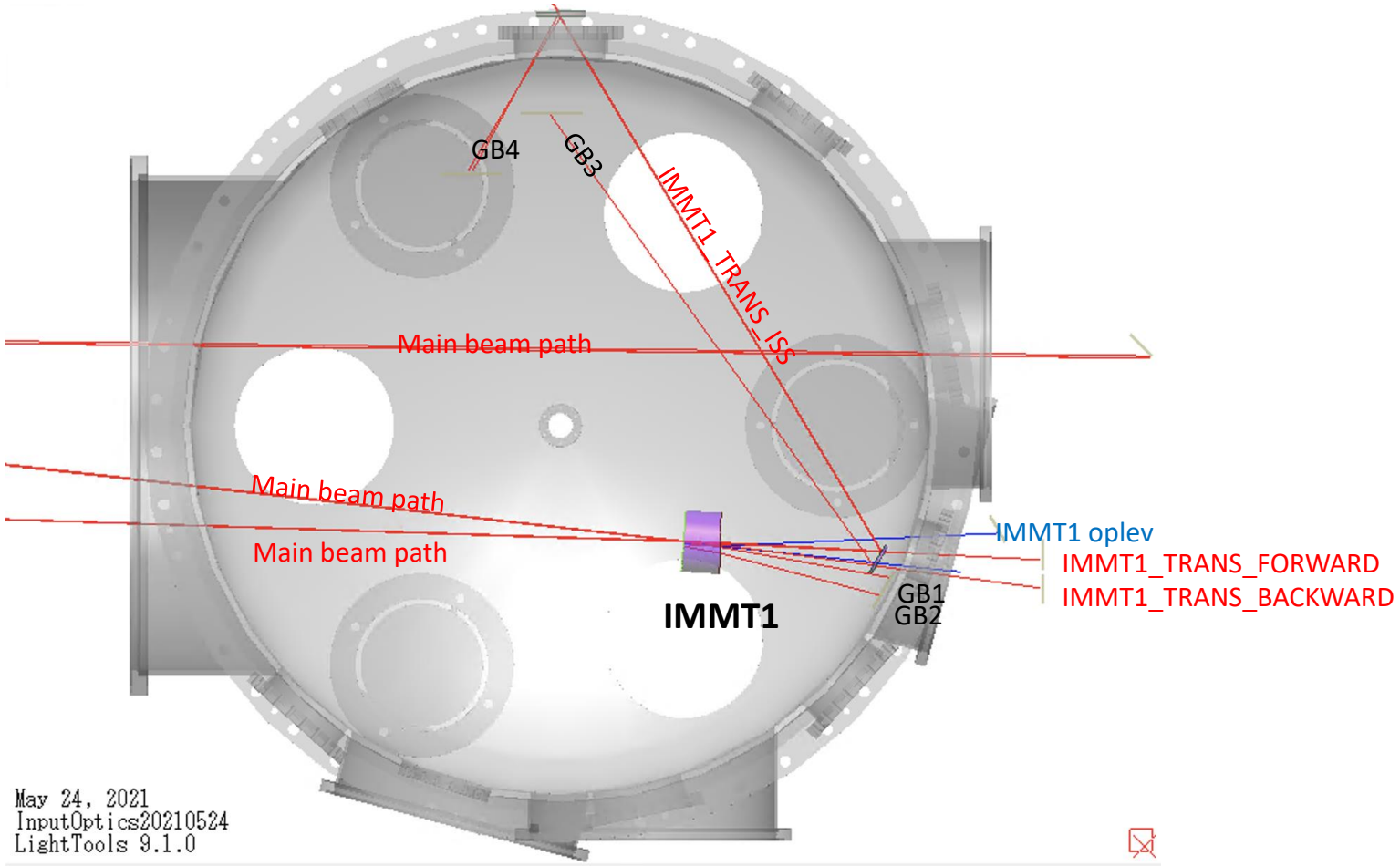
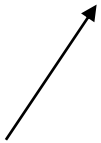


Figure from [JGW-G2112943]

Around IMMT1 (ISS related)

- Note that ISS POM has to transmit 670 nm oplev beam

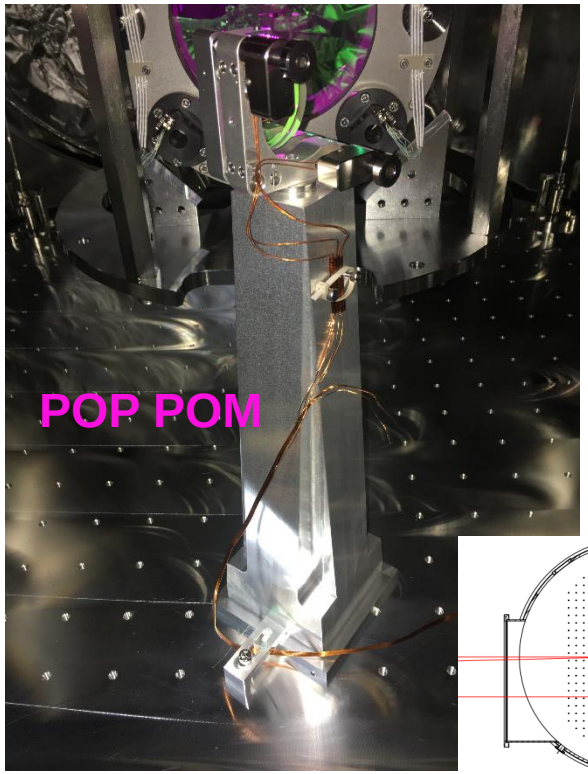
Name	Chamber	Wavelength	Polarization	Reflectivity and Incident angle	Currently installed
ISS POM	IMM	1064 nm 670 nm (oplev, T>90%)	S-pol	90% @ 28 deg	Not yet purchased

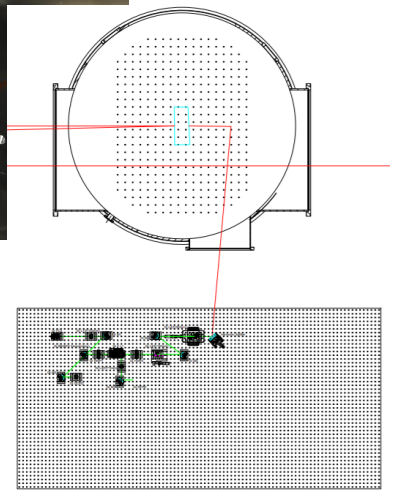


Reflectivity from JGW-T2112949
Incident angle from T. Akutsu (June 5, 2021)

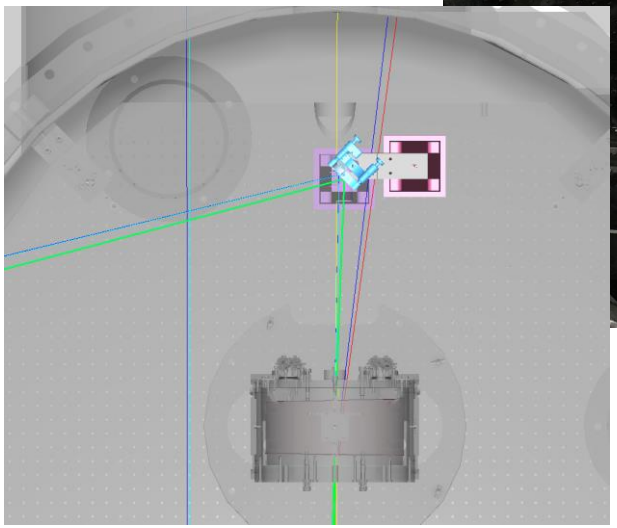
Around PR2 and SR2 (ALS related)

- Dichroic mirrors at the back of PR2 and SR2 for steering POP and POS beams, injecting green beams





[klog #4364](#)
[JGW-T1910659](#)
[JGW-G1808954](#)
[JGW-T1605261](#)



[klog #7794](#)
[JGW-L1909580](#)
[JGW-T1605967](#)

Around PR2 and SR2 (ALS related)

- Sigma Koki mirrors are used
  TFVMQ-50.8C10-20-W1D-532/1064-ARS-30-45D
  lambda/20 polished
  HR>99% for 1064 nm and 532 nm at 30-45 deg
  AR coated (<0.3% for 1064 nm, <2.0% for 532 nm)
  specsheet available from JGW-D1812591

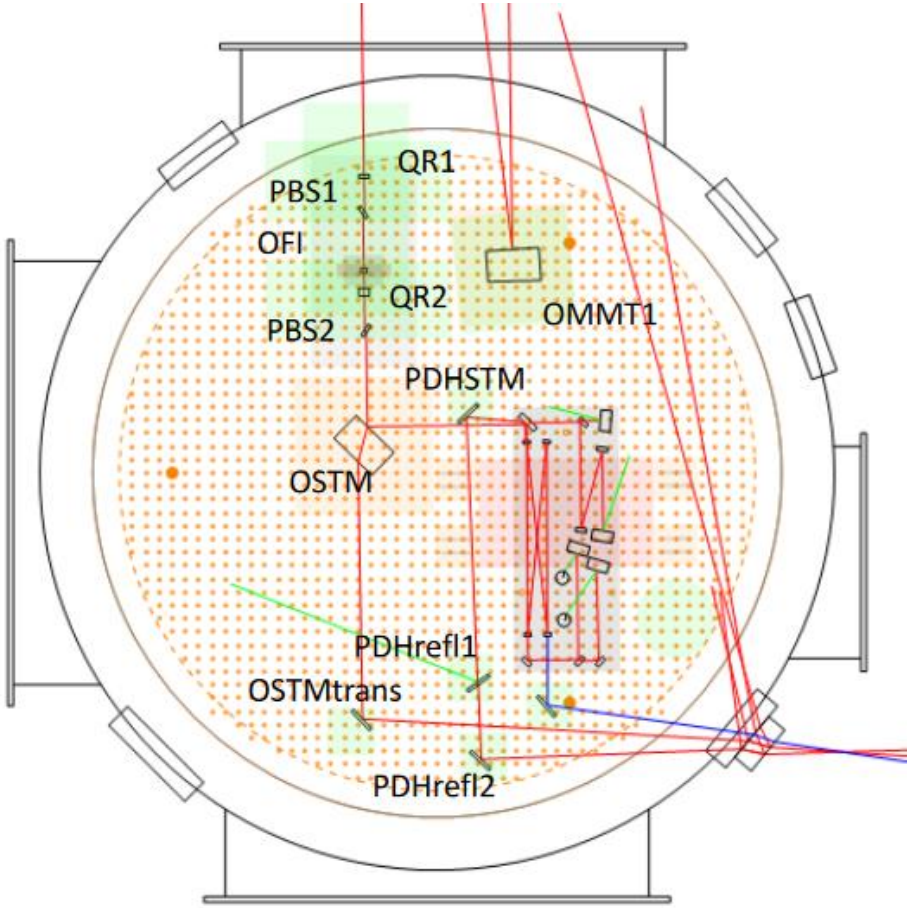
Name	Chamber	Wavelength	Polarization	Incident angle	Currently installed
POP POM	PR2	1064 nm 532 nm	S-pol (POP) S-pol (ALS)	~43 deg ~43 deg	Sigma Koki custom mirror
POS POM	SR2	1064 nm 532 nm	S-pol (POS) S-pol (ALS)	~36.5 deg ~36.5 deg	Sigma Koki custom mirror

From Lighttools
JGW-L1909580

JGW-G1808954

Around OFI and OMC

- P-pol after OFI; Steering OTSM trans (AS RF), OMC REFL and OMC TRANS



JGW-T1808230

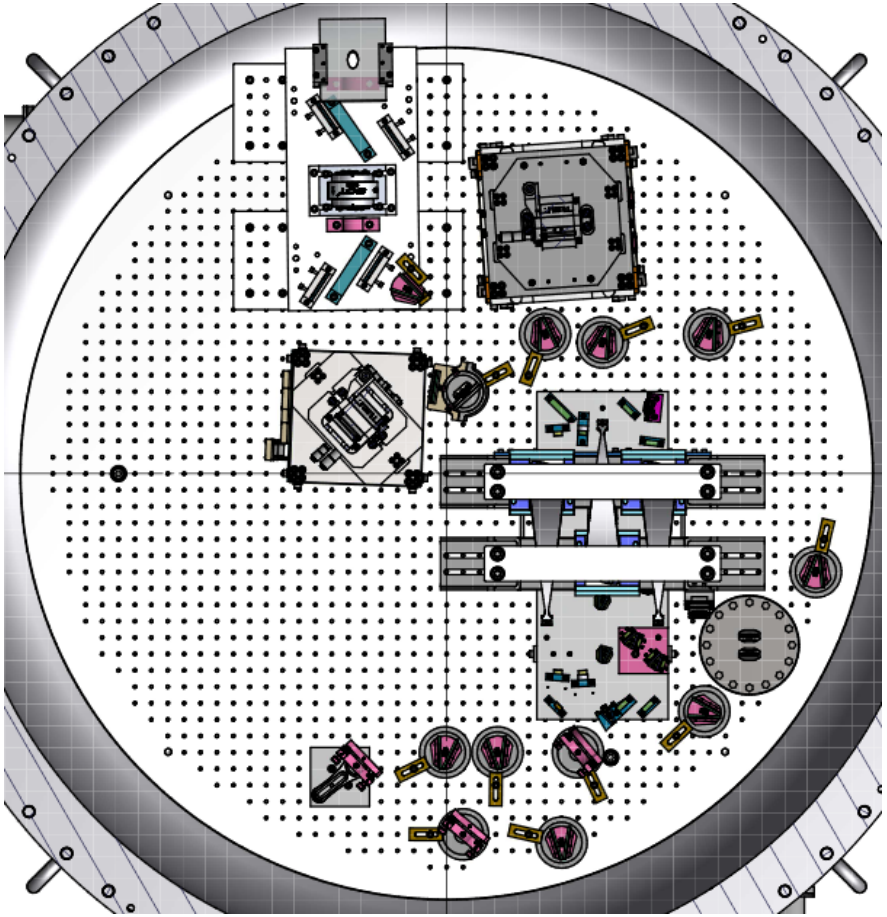


Figure from JGW-D2011398
See also JGW-T1605967

Around OFI and OMC

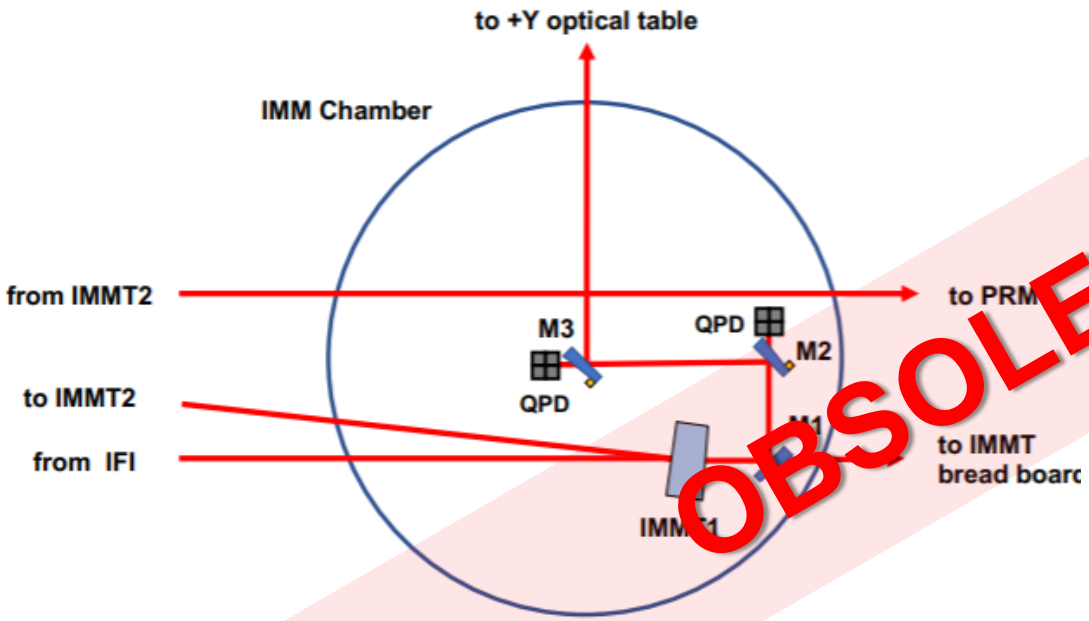
- Autex PYD-20 are used

Name	Chamber	Wavelength	Polarization	Incident angle	Currently installed
For OSTM TRANS	OMC	1064 nm	P-pol	???	PYD-20
For OMC REFL 1	OMC	1064 nm	P-pol	???	PYD-20
For OMC REFL 2	OMC	1064 nm	P-pol	???	PYD-20
For OMC TRANS	OMC	1064 nm	P-pol	???	PYD-20

OBSOLETE INFO

Around IMMT1 (ISS related)

- M1, M2 and M3 for steering IMMT1 trans



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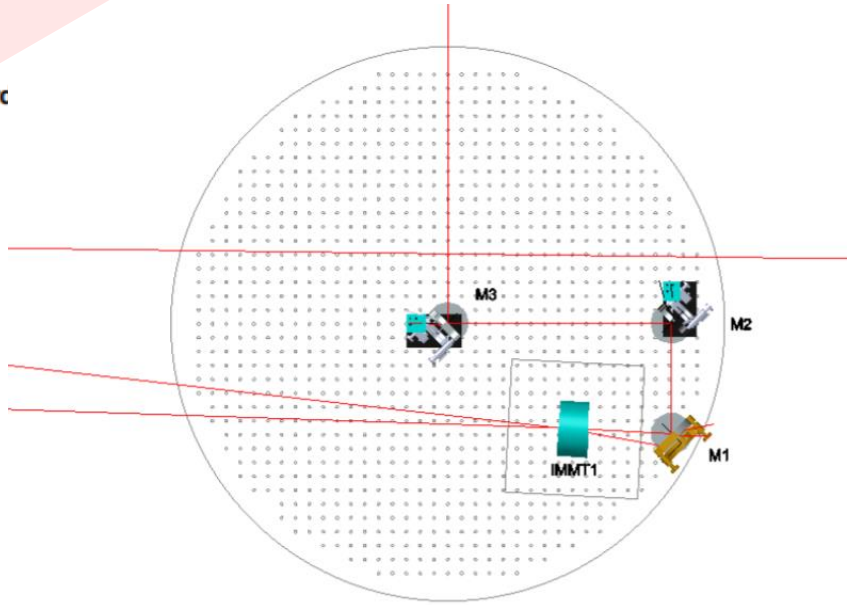

Figures from [JGW-G2012232]

Around IMMT1 (ISS related)

- To be determined by SEO and ISS team
- Note that M1 has to transmit 670 nm oplev beam

OBSOLETE

Name	Chamber	Wavelength	Polarization	Reflectivity and Incident angle	Currently installed
M1	IMM	1064 nm, 670 nm (oplev, T>90%)	S-pol	99.5% @ 45 deg	Not yet purchased
M2	IMM	1064 nm	S-pol	99.5% @ 45 deg	Not yet purchased
M3	IMM	1064 nm	S-pol	99.5% @ 45 deg	Not yet purchased

From Y. Moriwaki