

Cryogenic View Ports

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CLIO meeting

Motivation

To know what the heck the IFO is doing

We need as many auxiliary sensors/ports as possible

Sensors which need view ports

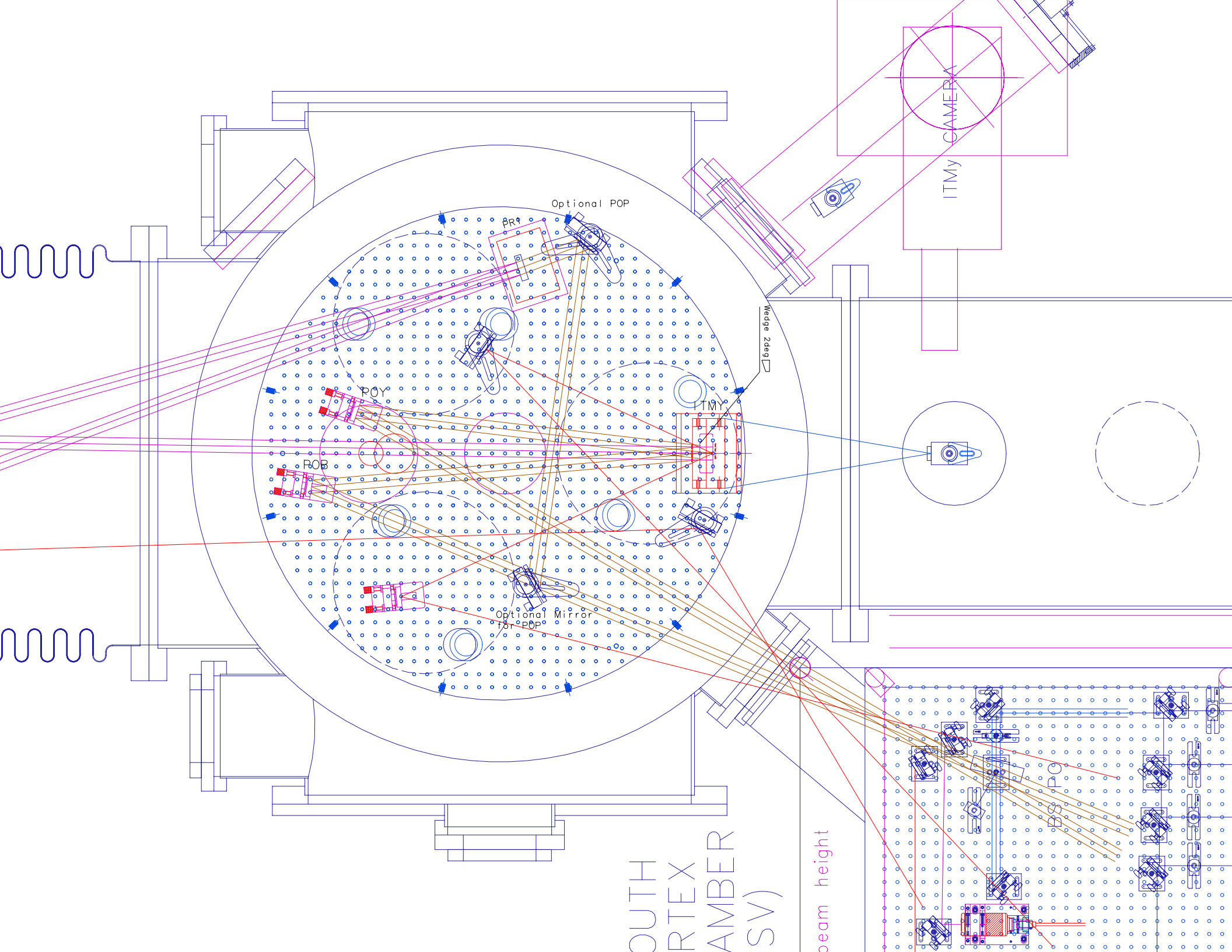
- Optical Levers
- Video Cameras
- Pick Off Ports
- Transmission Ports

Problem

Opening a view port will introduce thermal radiation from outside

Question

How do we introduce/extract necessary light without introducing thermal radiation ?



SOUTH
POLE
TELESCOPE
(SV)

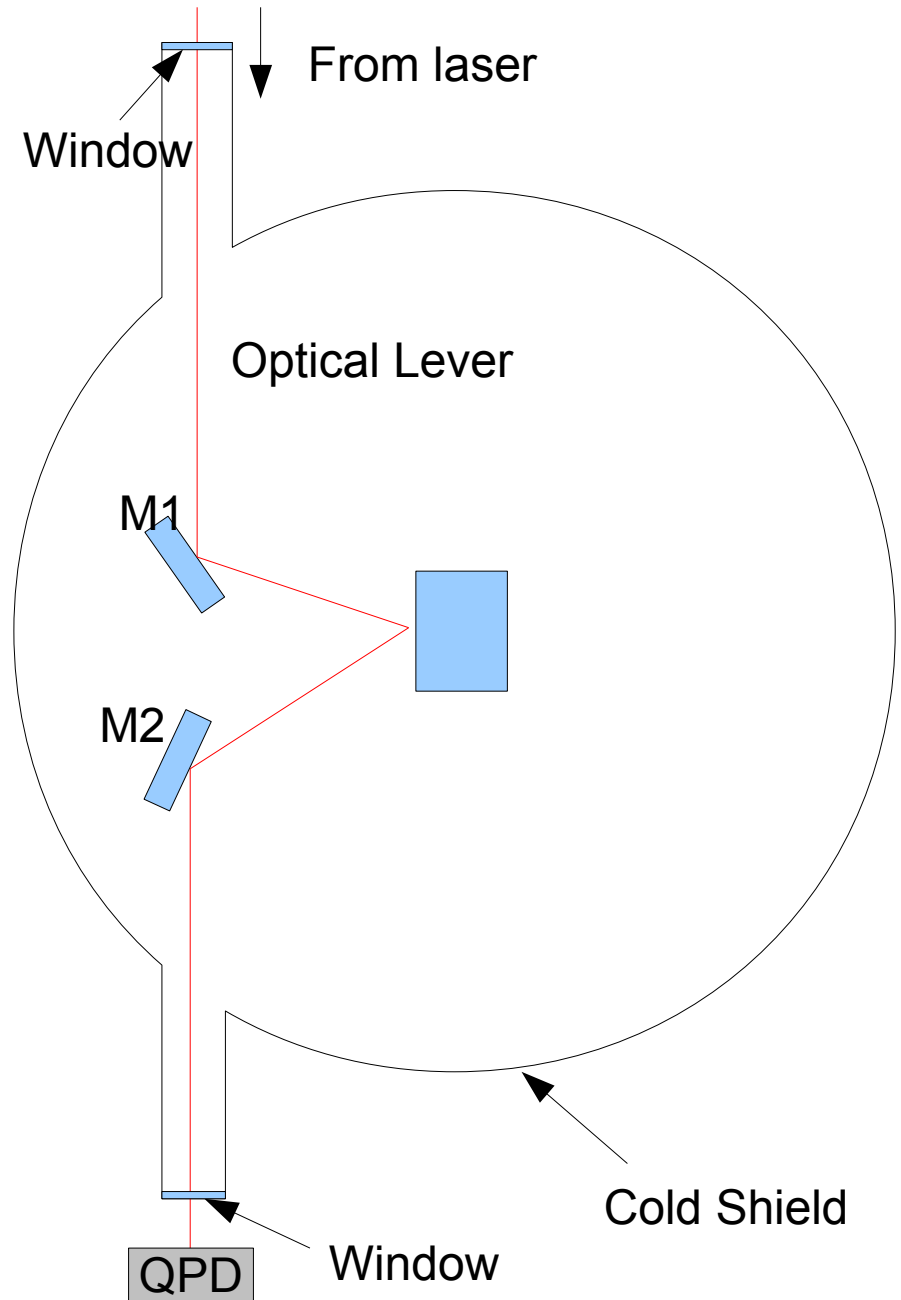
Some ideas

View ports cannot look directly at the mirror

M1 and M2 are transparent or absorptive for thermal radiation wavelengths.
(no radiation will be reflected toward the mirror)

Windows should be cold and coated to reflect thermal radiation.

For video cameras:
Illuminate the mirror with LEDs of non-absorptive wavelength for sapphire.



TO DO

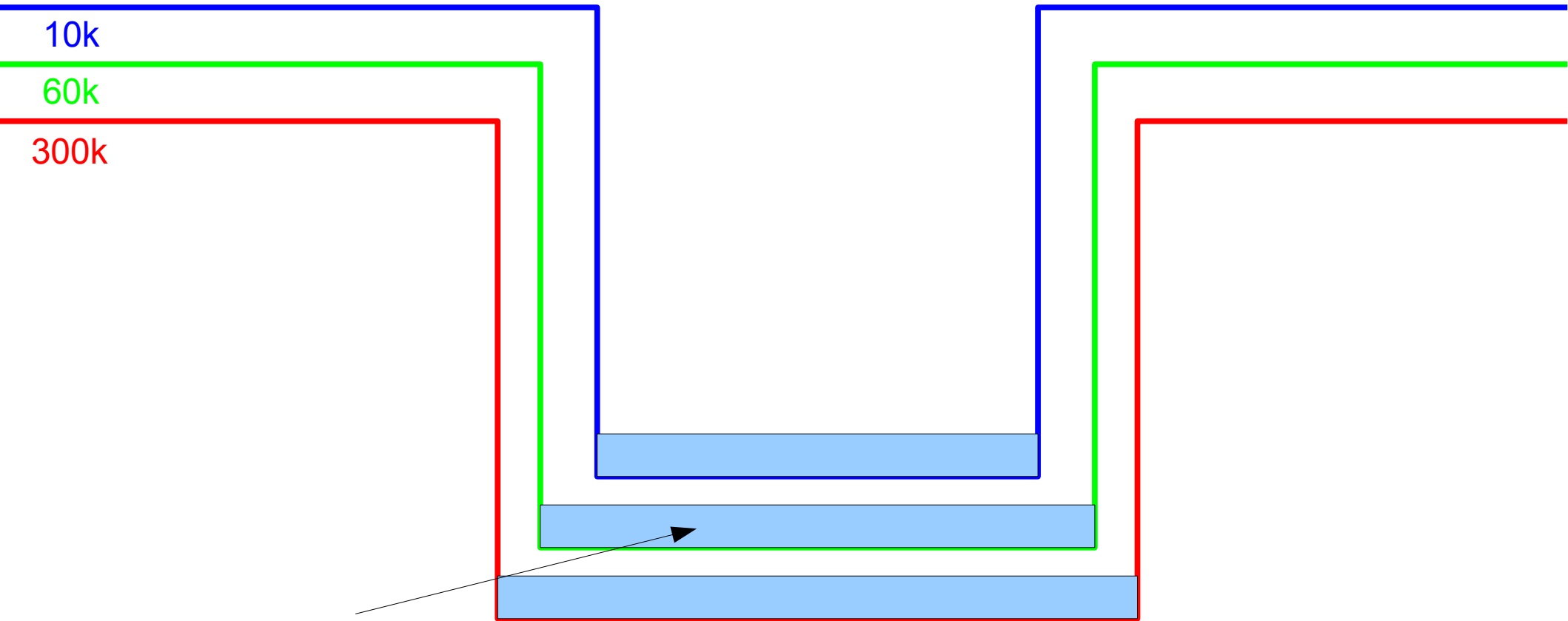
View port development

- Determine Requirements
- Research materials, IR filters, coatings etc.
- Optimal configuration
- Experiment

Other things to consider

- What kind of sensors do we need ?
- How many view ports do we need ?
- Drift of the steering mirrors by the cooling of the inner shield

Vacuum



10k

60k

300k

Low thermal emissivity
Sapphire ?
Absorbs most of the 300k radiation

Air