

JGW-T2416178

November 20, 2024

Updated: January 7, 2024

Updated: March 7, 2024

# Rough Sketch of In-Vac PD and QPD Layout Plans

Yuta Michimura

RESCEU, University of Tokyo

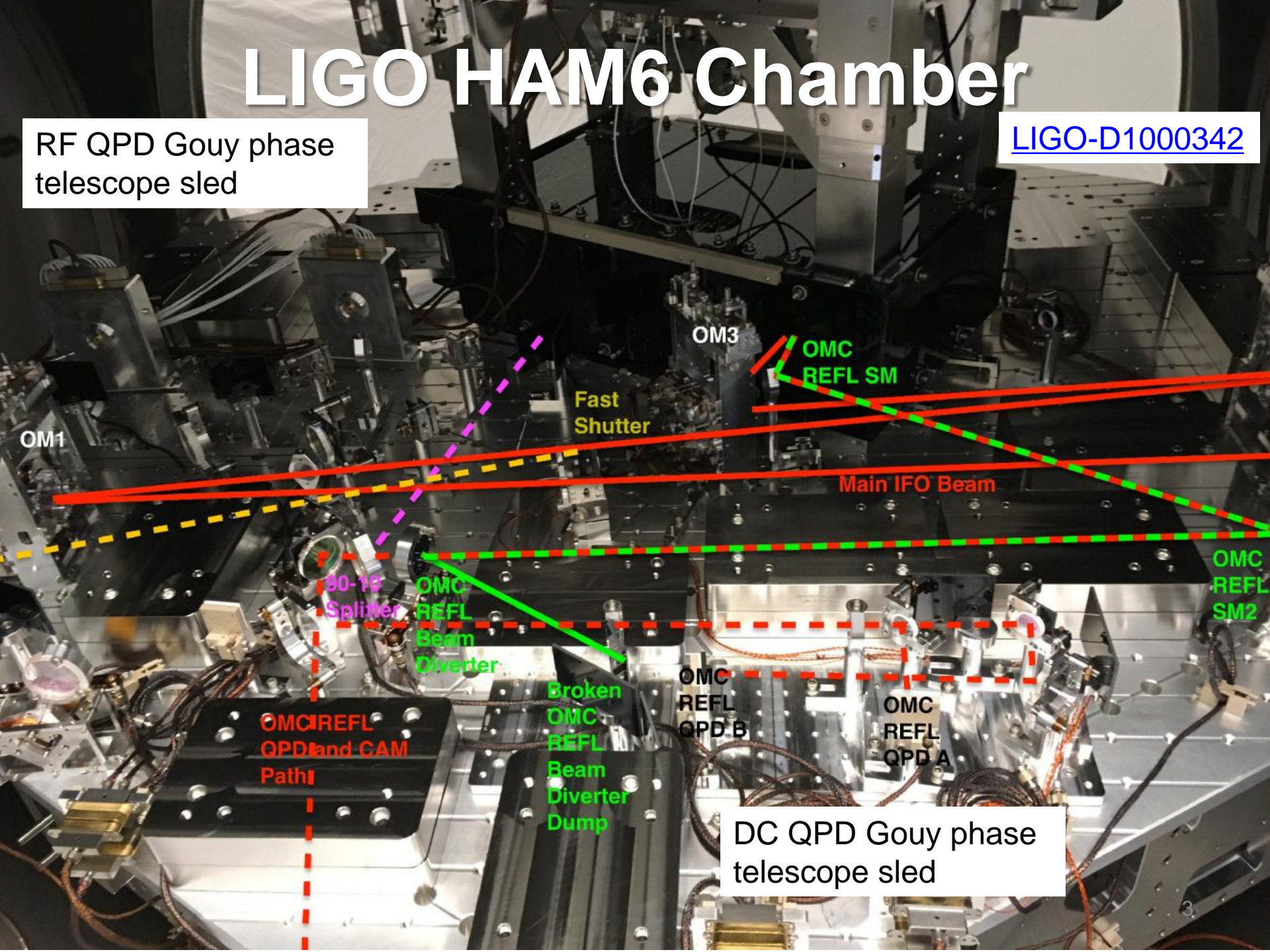
# References

- [JGW-G2416134](#) LSC RF PD In-vac Enclosure Review
- [JGW-T2416103](#) In-vac PD/QPD Layout Brainstorming
- [JGW-T1909817](#) AS in-air optical layout
- [JGW-G2315526](#) KFC interface optical layout
- [JGW-D2415729](#) 3D model of optics in OMC chamber (Oct. 18th, 2023) ***MOST UPDATED DRAWING NOW*** (*but not completely true*)
- [LIGO-T1000247](#) LIGO ISC Gouy phase telescope design
- [LIGO-D1002042](#) LIGO ISC QPD Sled Assembly

# LIGO HAM6 Chamber

[LIGO-D1000342](#)

RF QPD Gouy phase telescope sled



OM1

OM3

OMC REFL SM

Fast Shutter

Main IFO Beam

90-18 Splitter

OMC REFL Beam Diverter

OMC REFL SM2

OMC REFL QPD and CAM Path

Broken OMC REFL Beam Diverter Dump

OMC REFL QPD B

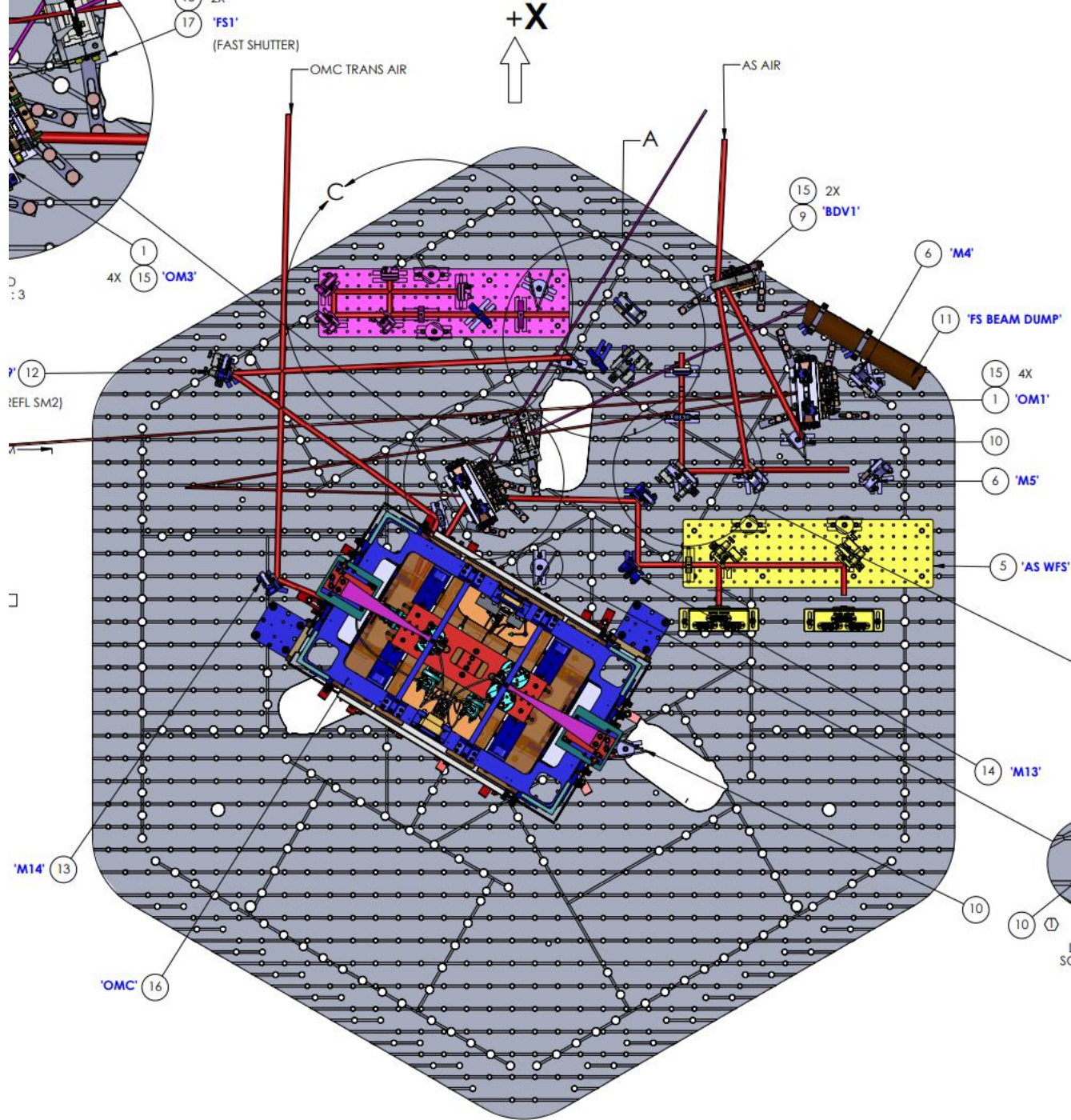
OMC REFL QPD A

DC QPD Gouy phase telescope sled



# LIGO HAM6 Chamber

[LIGO-D1000342](https://www.ligo.caltech.edu/document?id=LIGO-D1000342)



# AS Plan v1: Current layout

[JGW-D2415729](#)

q-parameter at OBS1 (first BS on OMC breadboard)

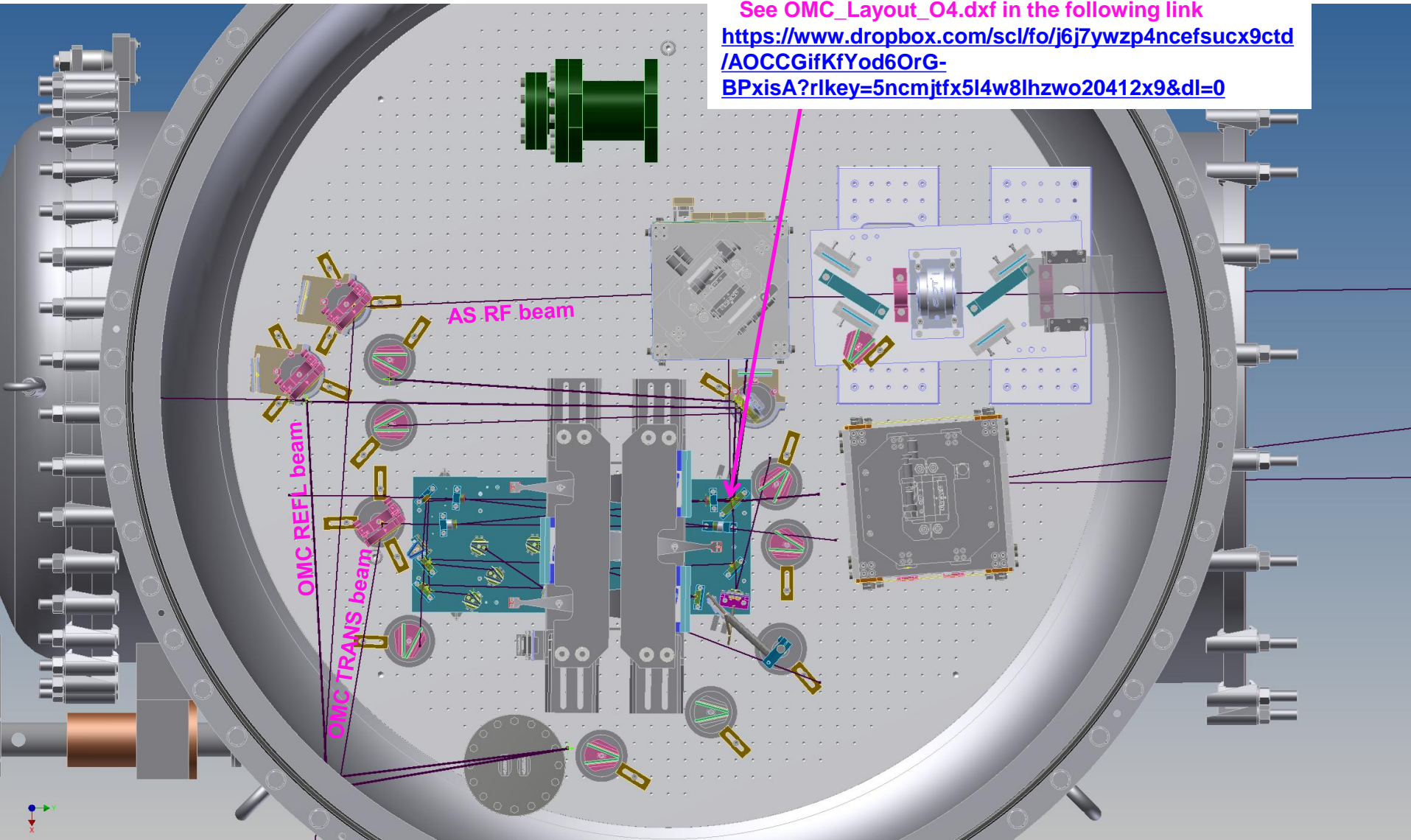
x:  $-0.2125961557874323+0.5247396669002964i$

y:  $-0.21291352981555933+0.5273533359729127i$

See OMC\_Layout\_O4.dxf in the following link

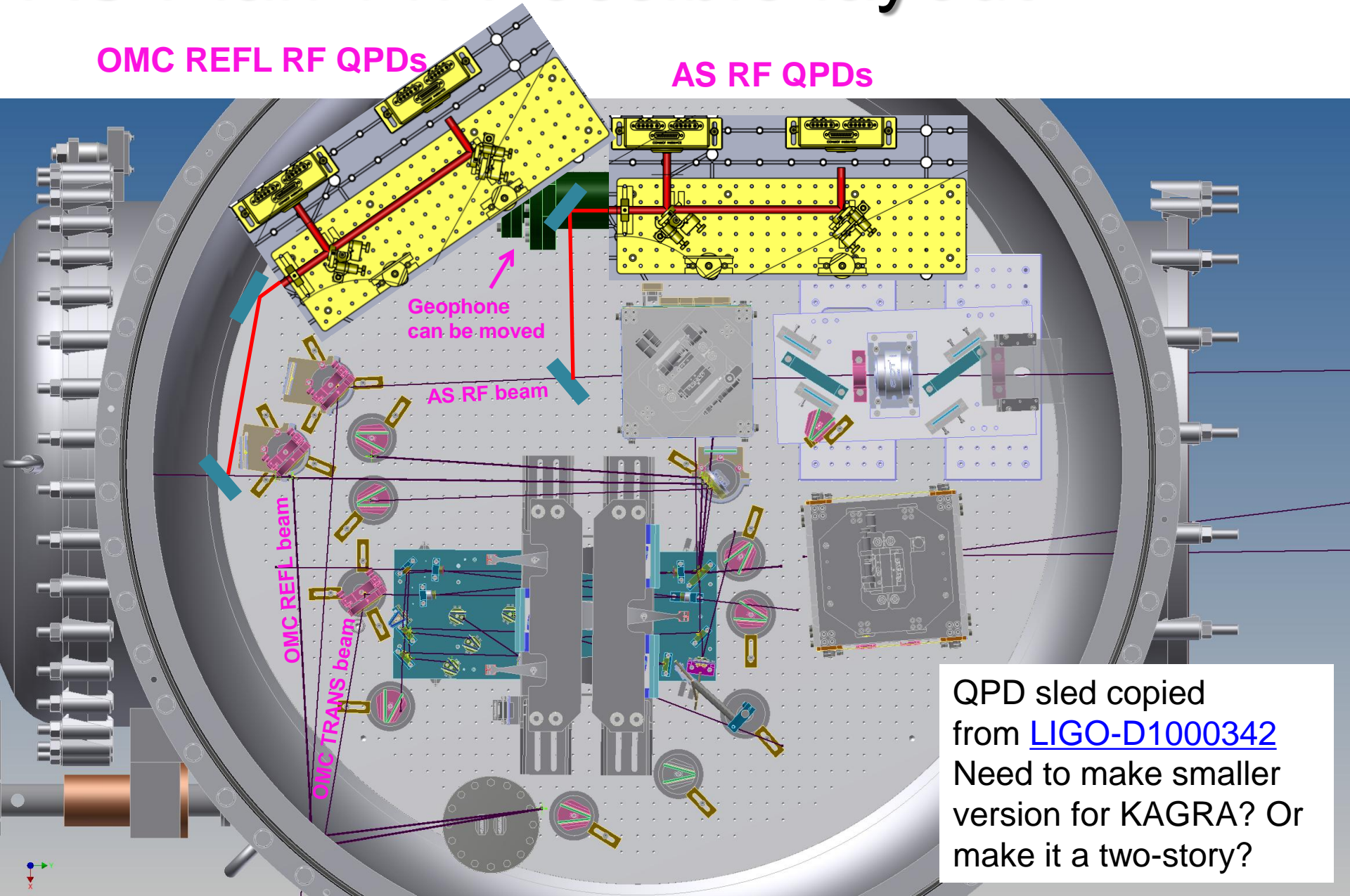
[https://www.dropbox.com/scl/fo/j6j7ywzp4ncefsucx9ctd/AOCCGifKfYod6OrG-](https://www.dropbox.com/scl/fo/j6j7ywzp4ncefsucx9ctd/AOCCGifKfYod6OrG-BPxisA?rlkey=5ncmjtfx5l4w8lhzwo20412x9&dl=0)

[BPxisA?rlkey=5ncmjtfx5l4w8lhzwo20412x9&dl=0](https://www.dropbox.com/scl/fo/j6j7ywzp4ncefsucx9ctd/AOCCGifKfYod6OrG-BPxisA?rlkey=5ncmjtfx5l4w8lhzwo20412x9&dl=0)





# AS Plan v1: Possible layout

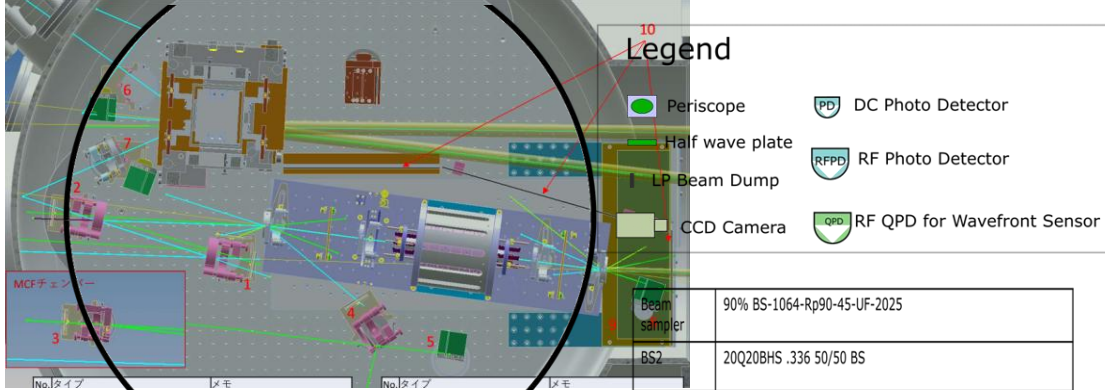


QPD sled copied from [LIGO-D1000342](https://www.ligo.org/documents/1000342)  
Need to make smaller version for KAGRA? Or make it a two-story?



# REFL Plan

## v1



Beam sampler	90% BS-1064-Rp90-45-UF-2025
BS2	20Q20BHS .336 50/50 BS
L3	NBK7 (f = 125 mm)
LNS1	LA1380-C-ML plano-convex f= 500 mm bbaoting 1050-1700 nm
HWP1	CVI-QWPO-1064-10-2
TFP	TFP-SN2-1064
BS1	10Q20HBS .335 50/50 BS
LNS2	EKSMA 110-0545E + AR 1064
HWP2	QWPO 1064-10-2
TFP2	EKSMA TFP

q-parameter at the viewport is  $-3.0348m+16.8565i$

Distance from the viewport to the top mirror of this periscope is 70 cm

from REFL viewport to periscope 70 cm

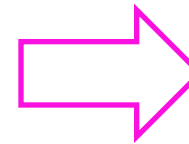
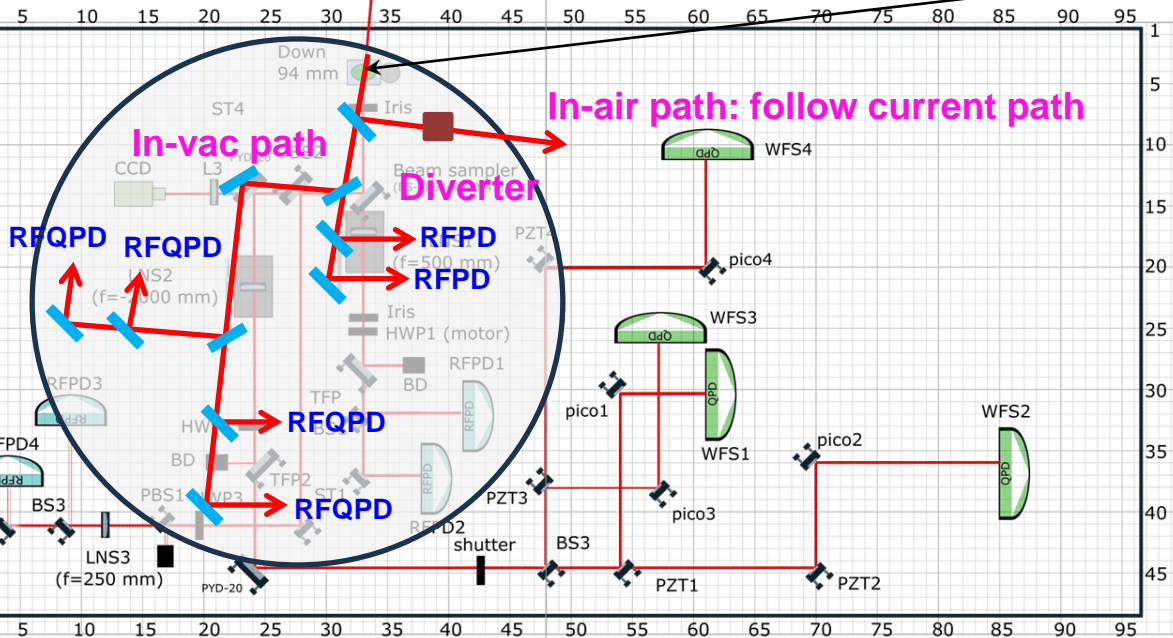
Add  $\sim\phi 1$  tank for PD/QPDs on top of REFL table  
Vibration isolation table in the tank

CL

In-air path: follow current path

In-vac path

Divertor

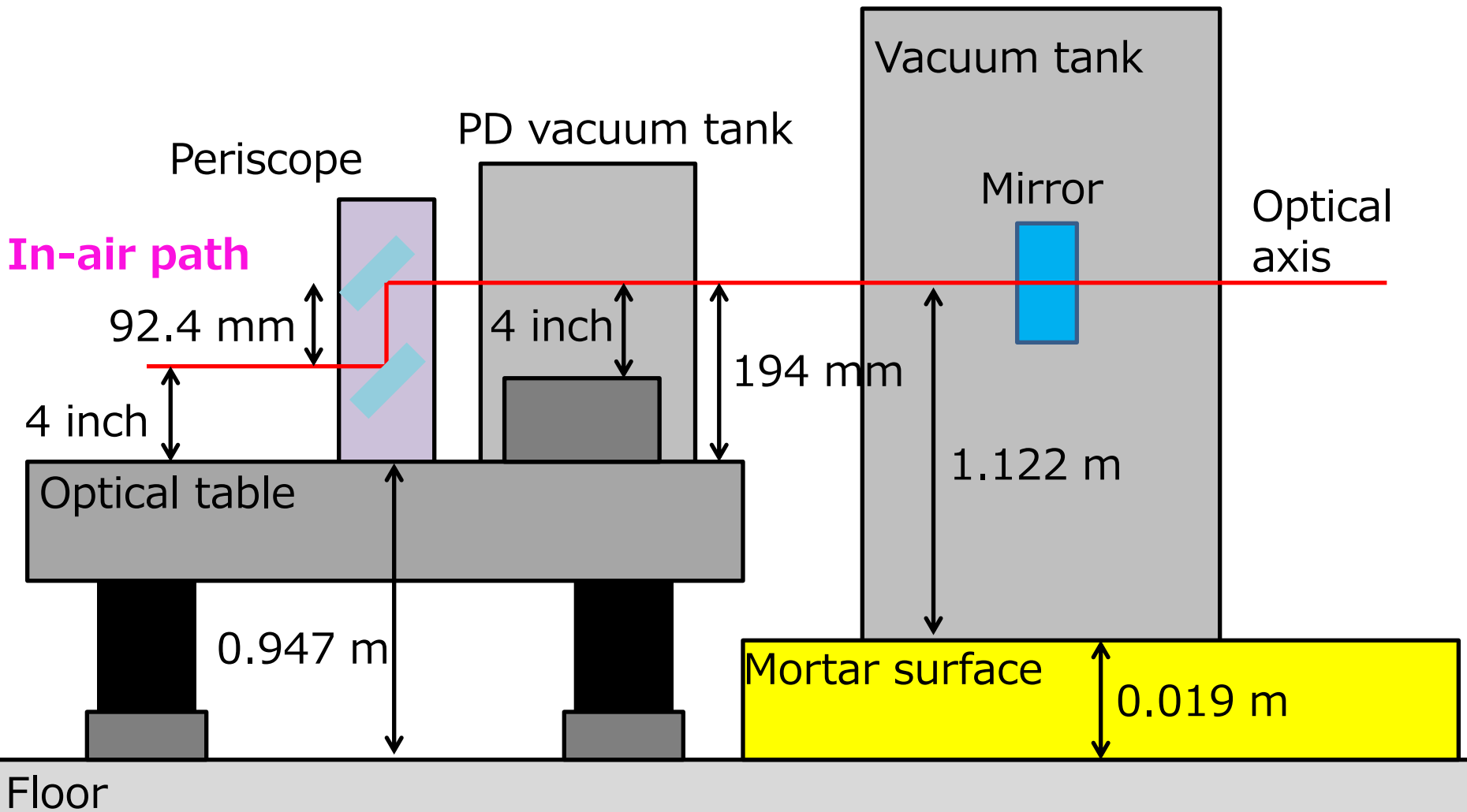


Move table towards +X if necessary  
(Anchor holes for optical leg clamps would not be there)

JGW-T1809238

# REFL Optical Table Height

[JGW-D1402607](#)  
[OutputTables wiki](#)





# POP Plan v1

- To be added