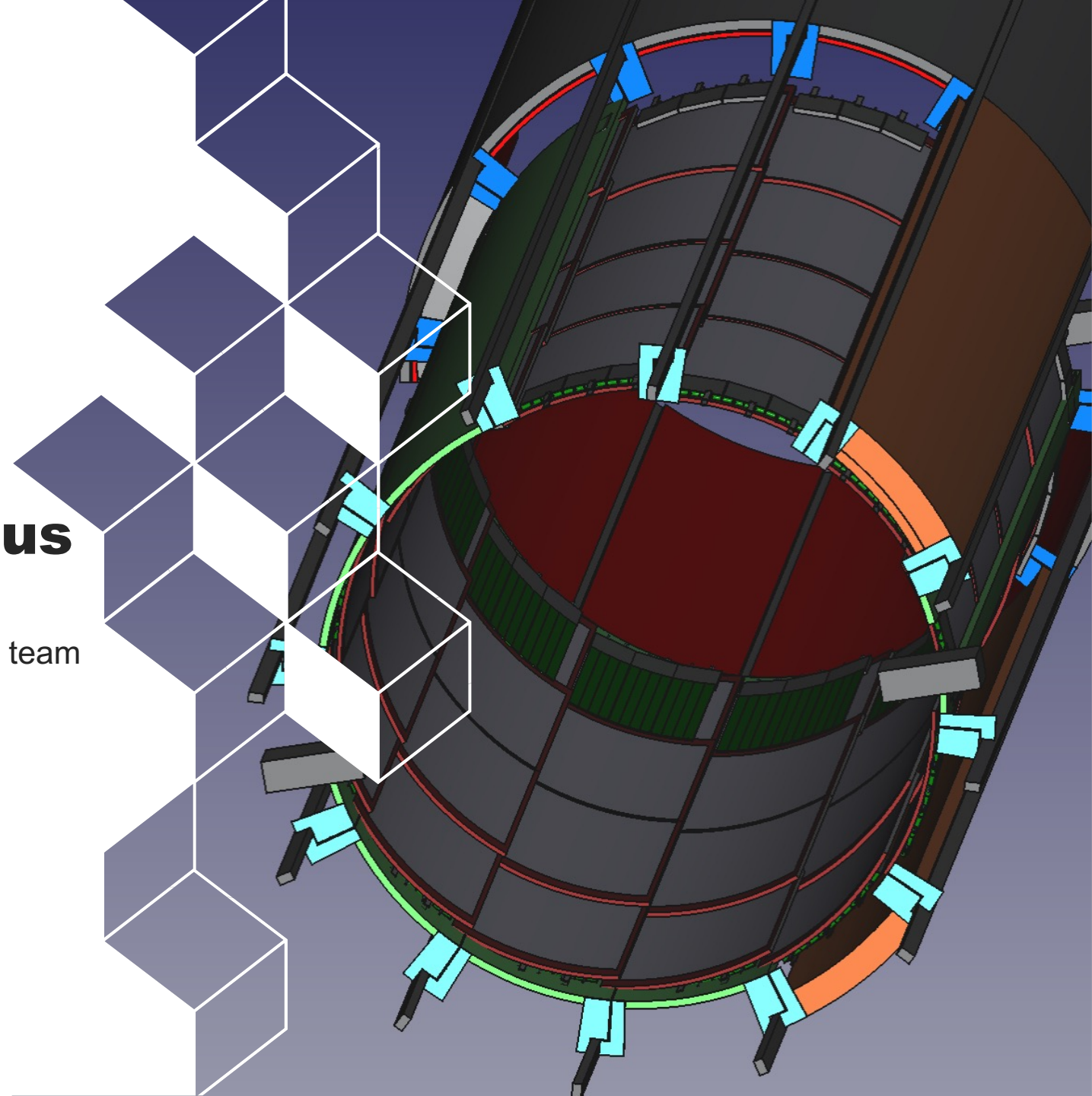
Inner MPGD CyMBaL Status

Alain Delbart, Seraphin Vetter, for the CEA/Saclay IRFU team



EIC/EPIC 3I meeting, 25 august 2025

CyMBaL development timeline (update)

2025 2026 2027 2028 2030

R&D and design (RDx)

- Finalization of the 2D readout R&D
- Choice of the r/o (**test beam**)
- Design of scale 1 prototype

Scale 1 proto GEICO

- Production and tests of the proto scale 1
- Validation of the tile design

Pre-production

- Production and tests
- Tests & Validation with SALSA2 FEB

Production

- Production of **48 tiles**
- Validation with cosmics and Fe55
- Tests and production of SALSA3 FEB
- Validation of the FEB→DAQ chain with detectors
- Shipments to BNL

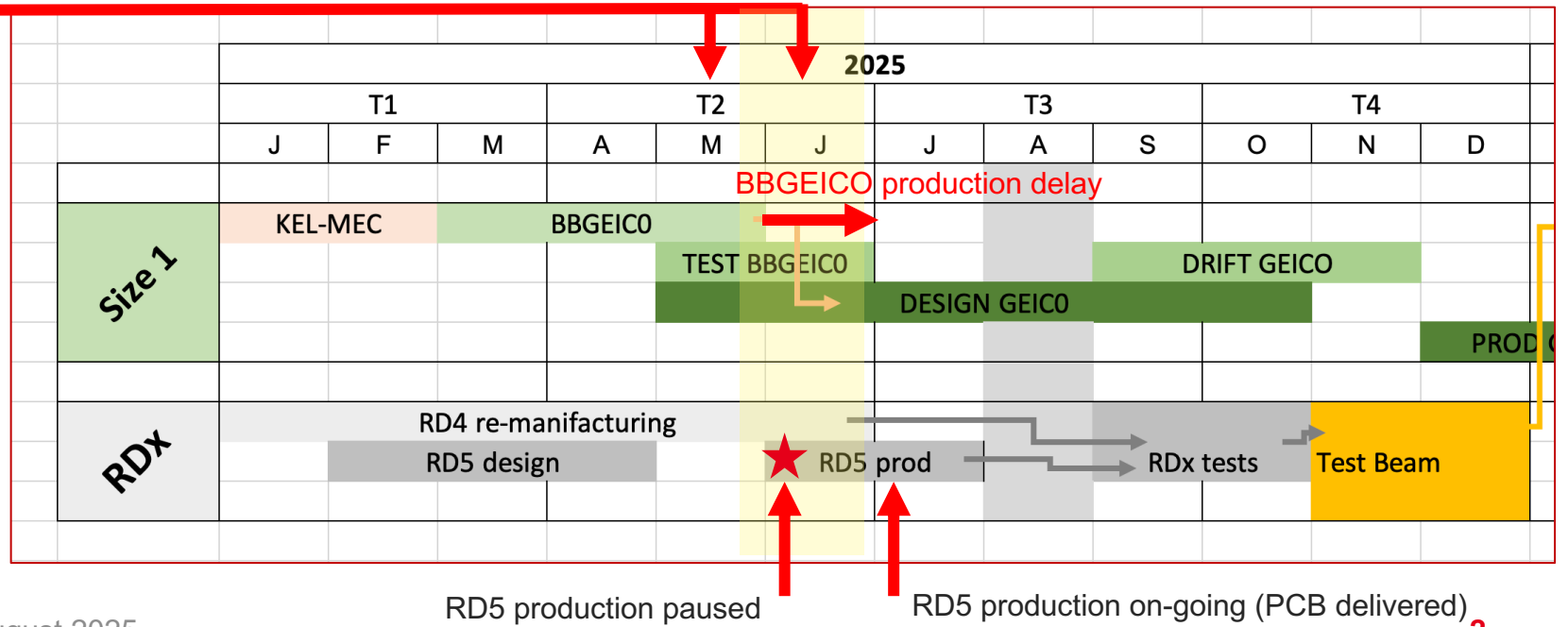
Installation

- Commissioning at BNL

+ MPGD base material change to Dynamask

CyMBaL Design

- Rdx prototypes to be tested with beam in nov. 25 (2D r/o choice)
- On-going CAD of tiles integration in **« fish scale »** configuration
- On-going cooling simulations :
  → **~T_{amb} water cooling @ few l/mn** should be OK
- **Update on services**



CyMBaL integration : envelop confirmed ?

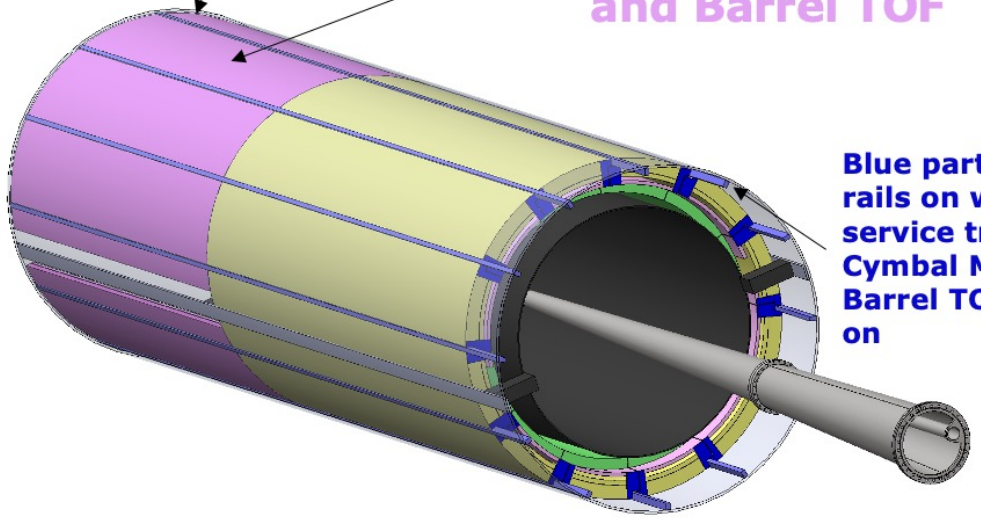
Nomenclature

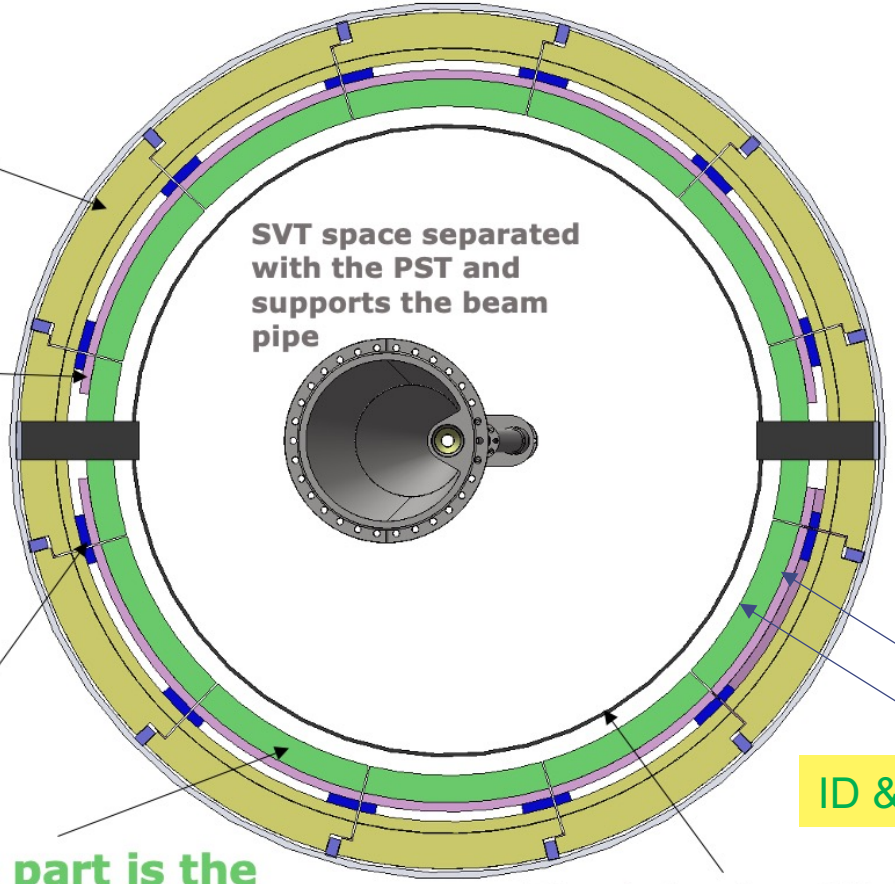
Gray is the global support tube (GST)

Yellow part is the 12th sector of the Barrel TOF

Pink part is the service trays of Cymbal MPGD and Barrel TOF

Blue part are the rails on which service trays + Cymbal MPGD + Barrel TOF slides on





Green part is the 12th sector of the Cymbal MPGD

Black is the SVT support tube (PST)

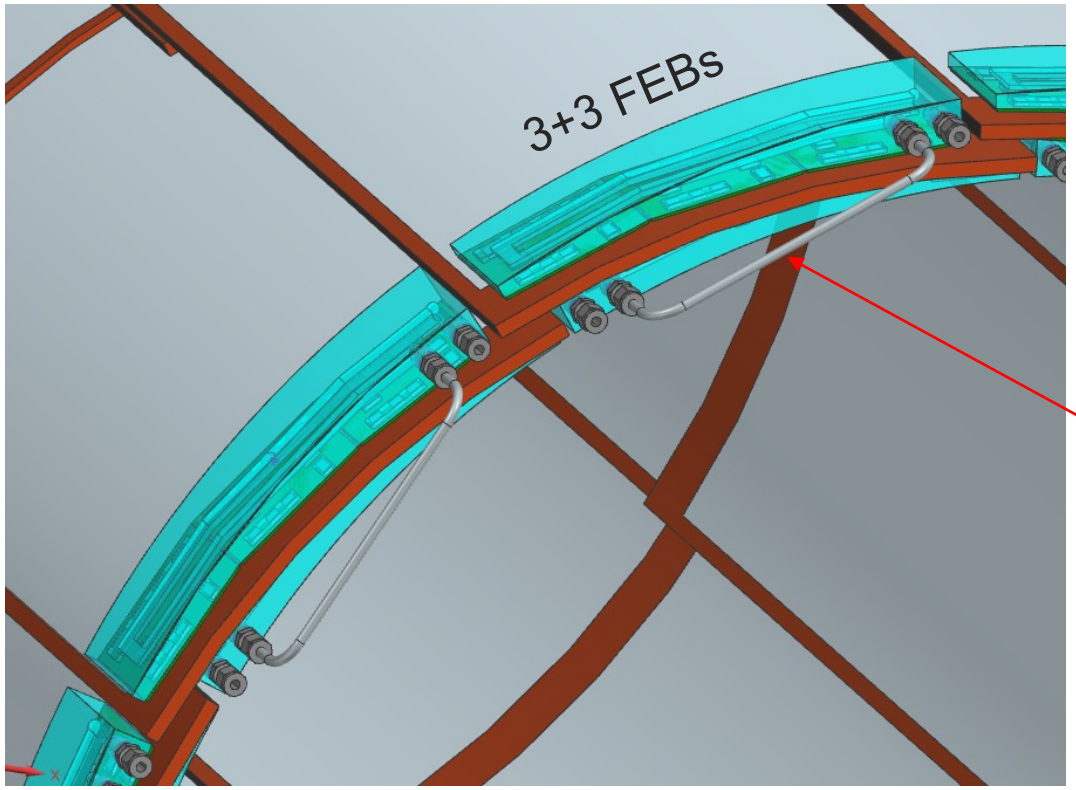
ID & OD to be confirmed

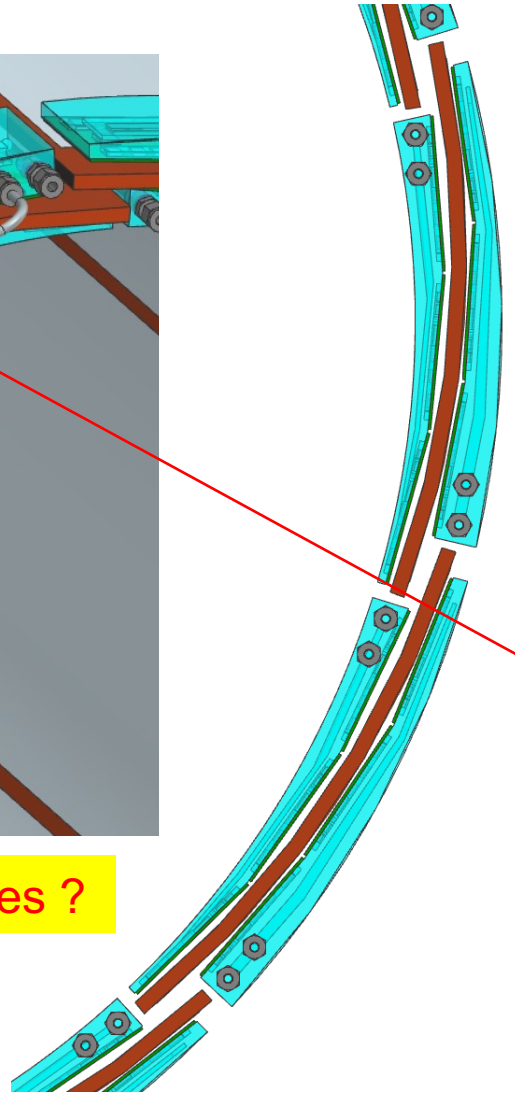
560-615 mm ?

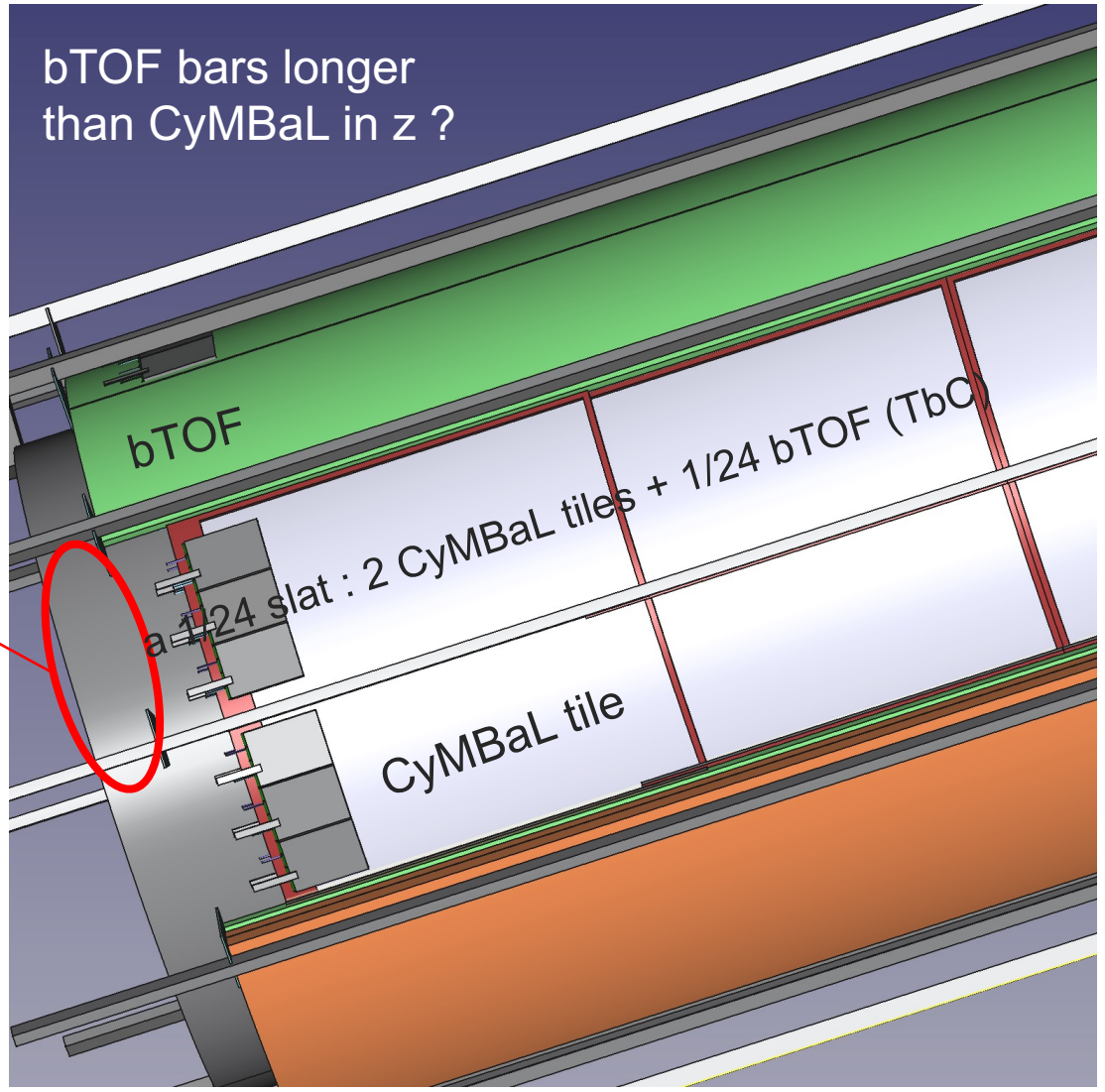
Sushrut Kamarkar (SVT workshop, july 10 2025)

On-going design study of CyMBaL integration

« fish scale » configuration







Envelop : available space in z on both sides ?

Detector parameters and services update

(in the 2 on-line sheets : « Detector parameters and services document » & « ePIC.Interface Control Document for Services052023)

Barrel Inner MPGDs Services

Person to contact - A. Delbart / I. Mandjavidze / S. Vetter
F. Bossu / F. Jeanneau

Cables, Fibers, etc.

Item	Description	Quantity	Diameter	Estimated Length	Notes	Assumptions
FEE data	VTRX+ MPO parallel optical fiber	144	connector 10mm To DAM		https://suddendocs.samtec.com/catalog_english/ecue.pdf	
~~RDO data~~	~~FEE optical fibers~~	~~72~~	~~3.2mm~~	~~TBD~~	~~hypothesis: 2 FEB for 1 RDO; **TBD;** MTP® 12 (Male) to MTP® 12 (Female) OM4 Multimode Elite Trunk Cable, 12 Fibers, Type B, Plenum (OFNP), Magenta~~	
HV cables	HV cables to patch panel	144	3.2mm	to patch panel	HTC-50-1-1, 0.5Lz/1.5, CEH50 Dakra; to patch panel Max volume occupancy: 3 x OD 3.2mm cables per tile	Max volume occupancy
	1 drift + 2 resistive					
HV cables	HV cables from patch panel to Rack	TBD (example. ten 9-channel HV cables)	TBD	TBD	possibly high density cables.	
LV cables	**From DC/DC** to FEB	144	0 / 4 to 5.5 mm	0/ 0.3 to 1 m	Alpha Wire 3464C (<0,3m), 6328 (0,3-0,5m), 2414C (upt to 1m)	
LV cables	From LV PS **to DC/DC**	144	6 mm	TBD	Alpha Wire 2424C	Alpha Wire 2424C
DCDC	step down DC voltages at patch panel?	TBD	TBD	TBD	DCDC are need to step down voltages efficiently. At the patch panel?	
Gas tubing	inlet and outlet each 2 modules in serie	24 IN / 24 out	4mm	TBD	https://www.mcmaster.com/5384K524/	2 tiles in series
Flat cables	flat cables from modules to FEEs	1152	1mmx20mm	10cm / 50 cm	within the CYMBAL envelop	

Cooling, etc.

Item	Description	Quantity	Diameter	Estimated Length	Notes	Assumptions
Cooling tubing	Cooling tube to FEEs, N FEE in series TBD	24 IN / 24 out (if 6 FEBs in series)	6.25mm	TBD	https://www.mcmaster.com/5648K74/	6 FEBs in series