New Setup

for

Dart Chamber in ArDM

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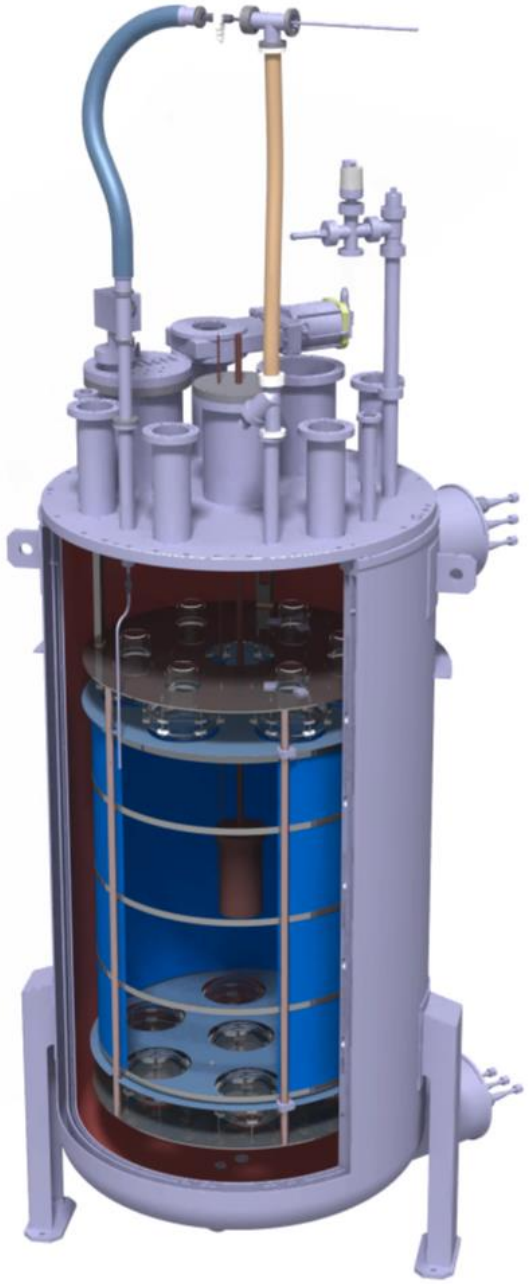
21.04.2022

SUMMARY:

Design (slide #3 to #10)

- Overview
- Top Flange

Work at LSC &Assembly Procedure (slide #11 to #20)



DESIGN:

4 x Pillars Flange to PMT Array:
~1.7 Kg Stainless Steel per Pillar
Top and Bottom insulated with PEEK

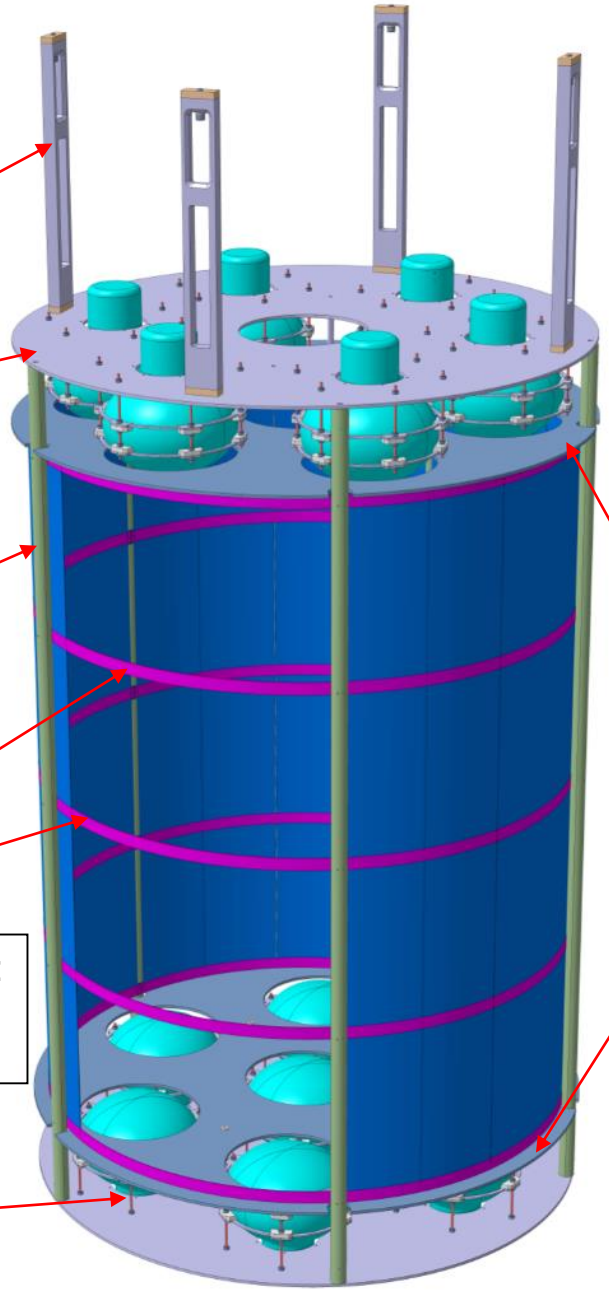
Top PMTs Array:
- 6 PMTs
- No PMT in Center

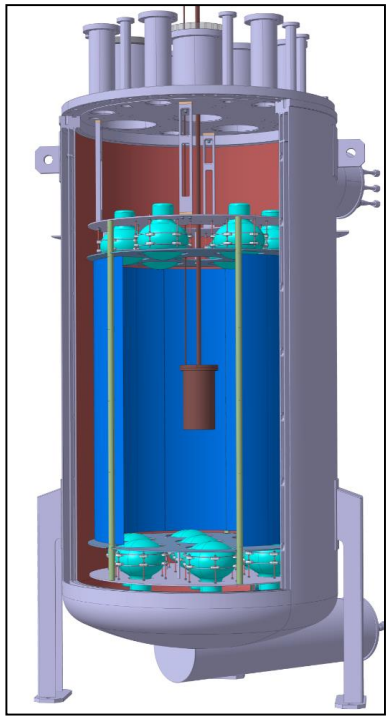
5 x Cu Pillars: 25mm Dia
~5.3Kg per pillar

Vertical Reflector

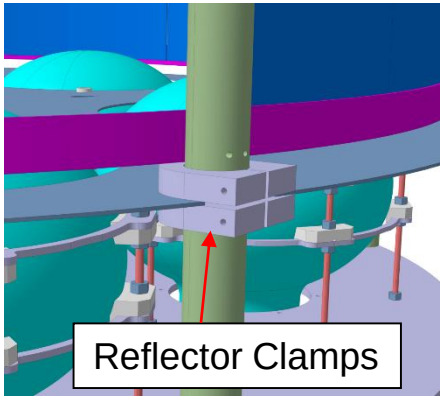
5 x SS rings Vertical Reflector supports:
- SS plate 20mmx2mm
- ~0.8 Kg per Ring

Bottom PMTs Array:
- 7 PMTs





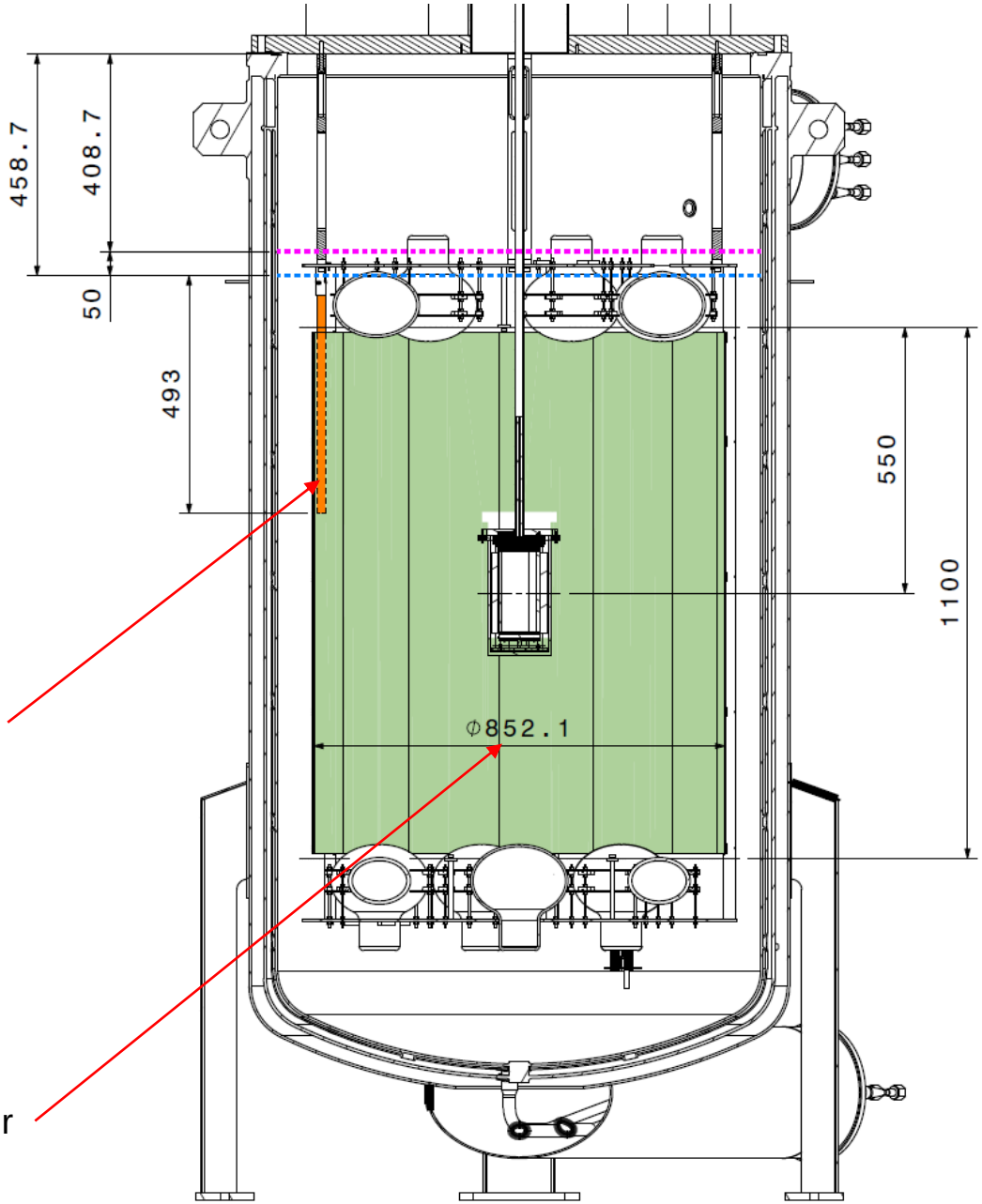
PMT Reflector:
- PTFE 1.5mm thick



DESIGN:

ArDM LAr Level

New LAr Level

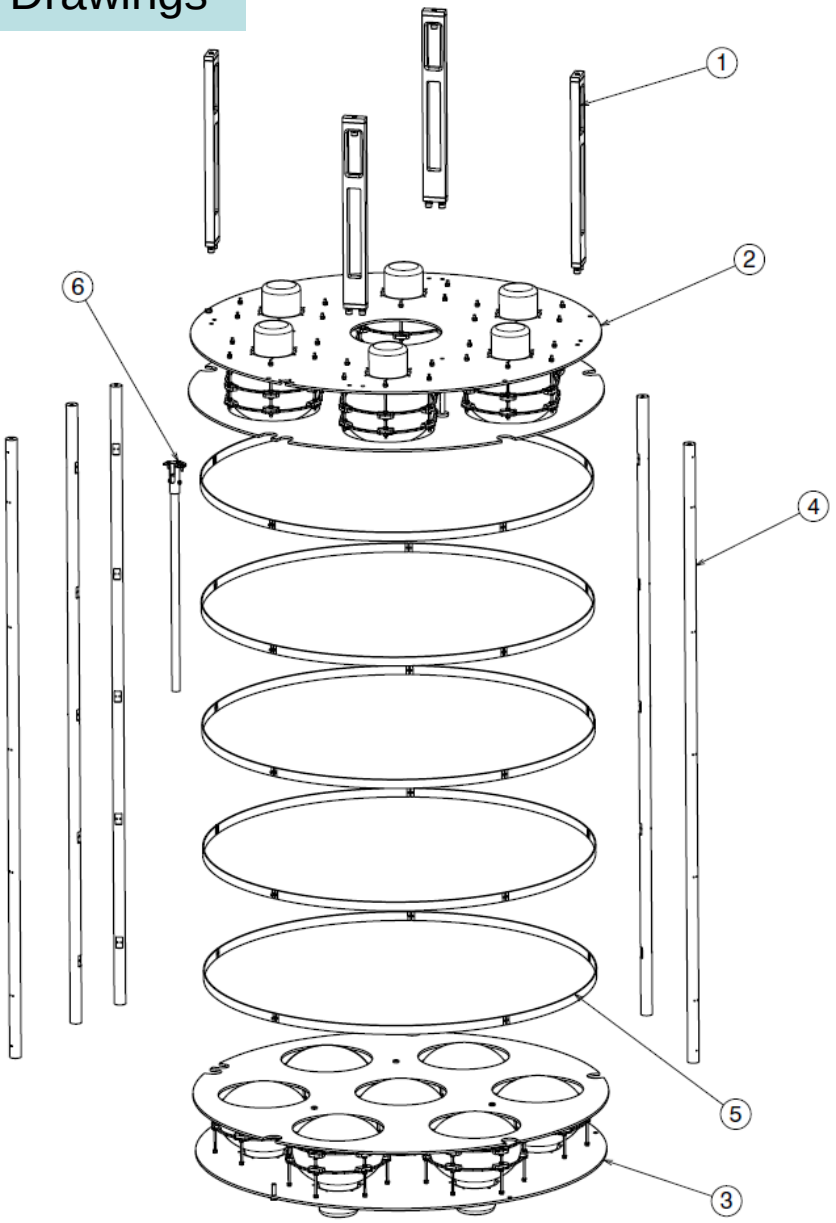


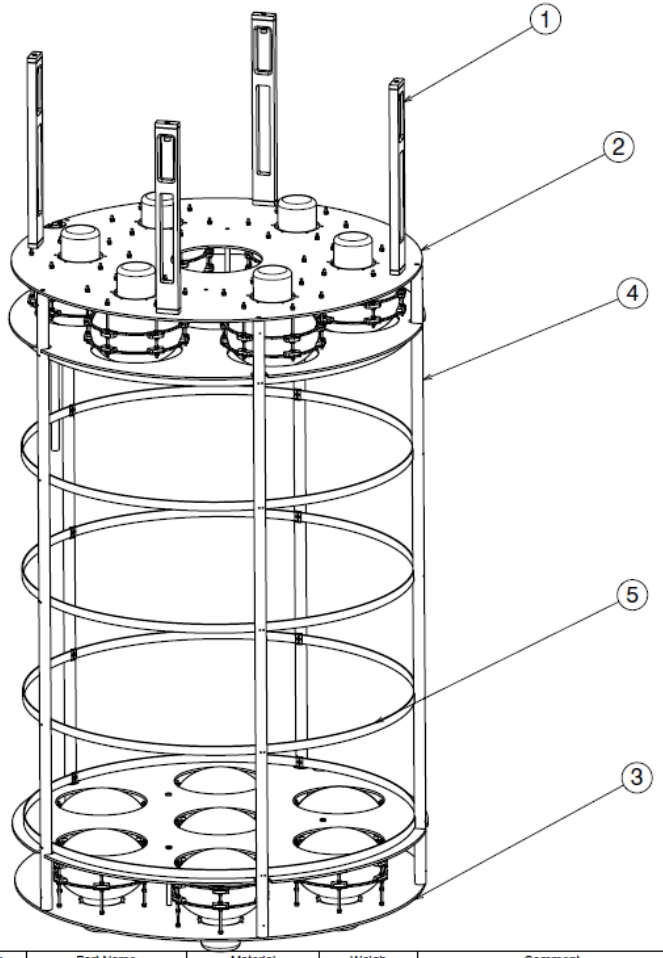
Height between Top and Bottom PMMA Reflector

3x1x1 Coaxial Levelmeter:

Diameter Inside the Reflector

2D Drawings





Pos	QTY	Art-Number	Part Name	Material	Weigh	Comment
1	4	DArt_100	Top Support Pillars	SS304/PEEK		
2	1	DArt_200	Top PMTs Support	SS304/PE1000/PMMA		
3	1	DArt_300	Bottom PMTs Support	SS304/PE1000/PMMA		
4	5	DArt_400	Long Pillars	Cu O Free		
5	25	DArt_500	SS Vertical Reflector Holder	SS 304		
6	1	DArt_600	Coaxial Levelmeter Support	SS304		Only Support/ Cu Levelmeter from 3x1x1
7	1	DArt_700	Assembly Ring	SS304		Only for Assembly/ not part of the Detector

Project:	DArt										Scale	Tot Pages
Sub-Proj.:	Sub-Project Name										-	1
Assembly:	Assembly Group Name											
Created:	18.03.2019	Adamo Gendotti	Dimensions	From	1	6	30	100	300	1000		Page N°
Last Mod.:	DD.MM.YYYY	Name		To	6	30	100	300	1000	2000		1
Constructed:	DD.MM.YYYY	Name	Tollerance		±0.1	0.2	0.3	0.5	0.8	1.2		

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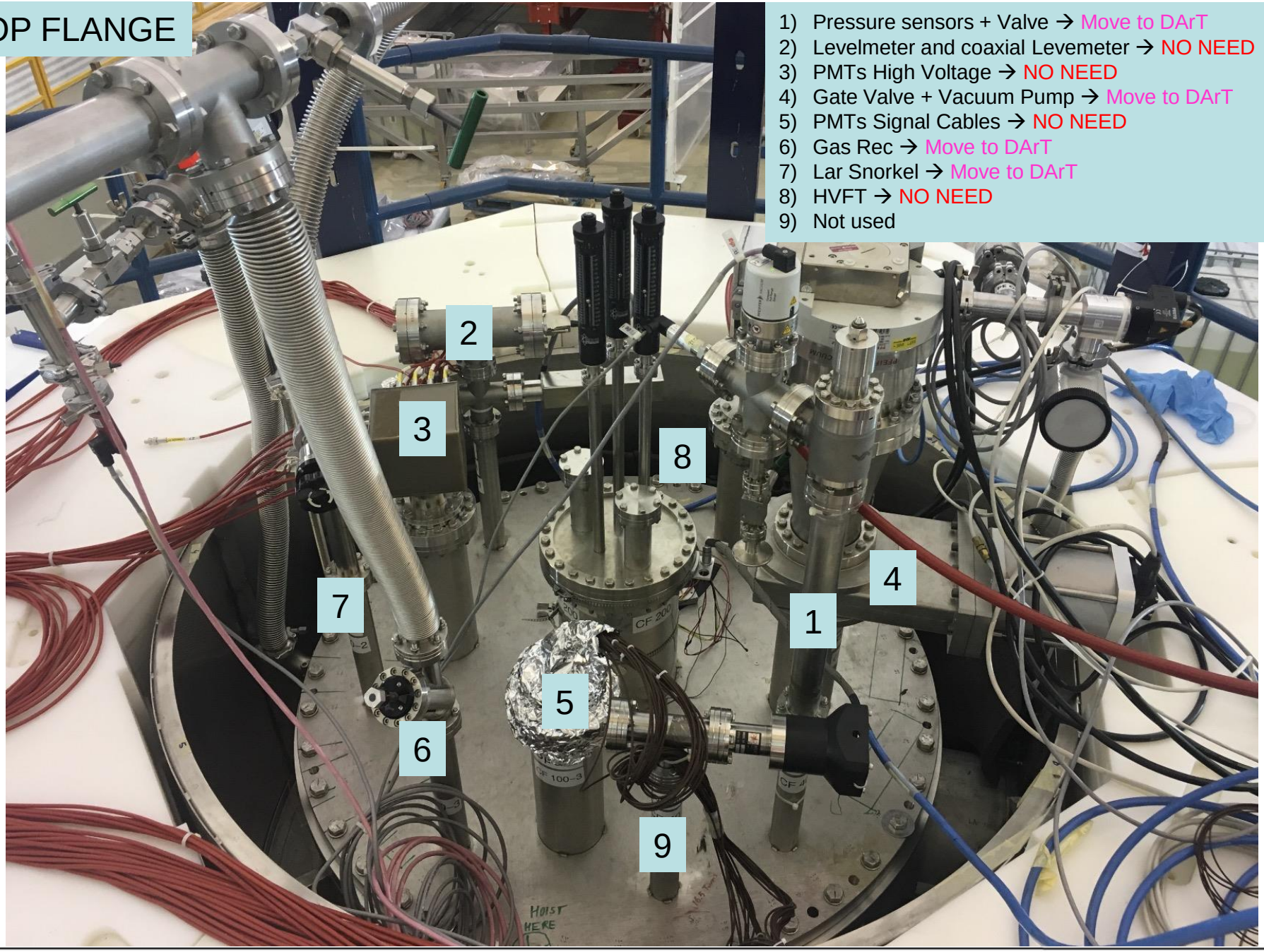
DArt Detector Overview

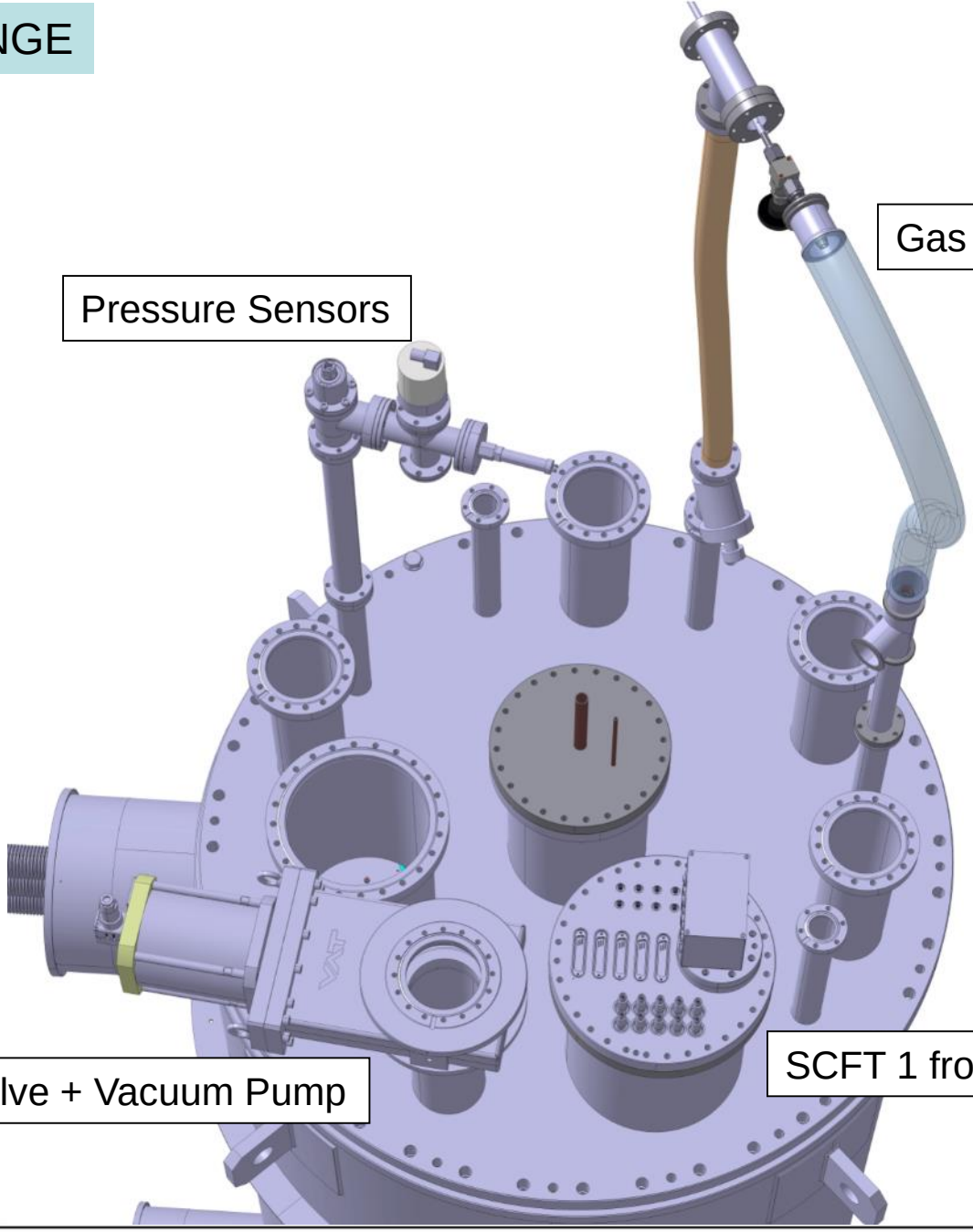
XX-XXXX

TOP FLANGE

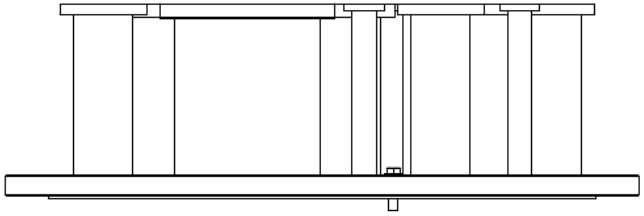
1) Pressure sensors + Valve → Move to DArT
2) Levelmeter and coaxial Levemeter → NO NEED
3) PMTs High Voltage → NO NEED
4) Gate Valve + Vacuum Pump → Move to DArT
5) PMTs Signal Cables → NO NEED
6) Gas Rec → Move to DArT
7) Lar Snorkel → Move to DArT
8) HVFT → NO NEED
9) Not used

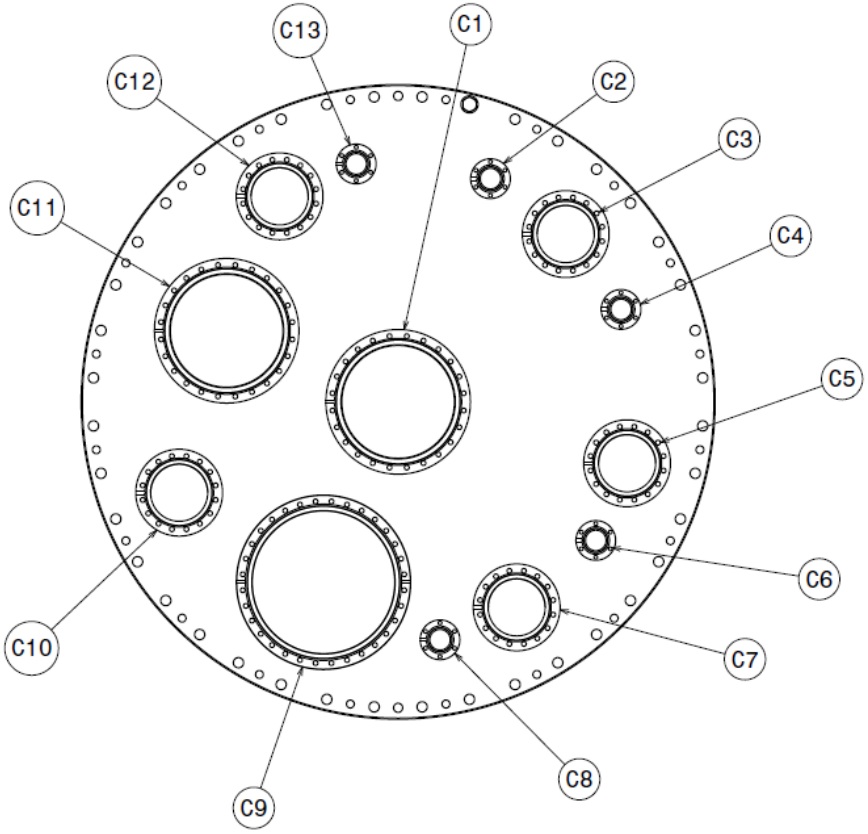


TOP FLANGE


Gas Rec. and LAr snorkel
Pressure Sensors
SCFT 1 from 3x1x1
Gate Valve + Vacuum Pump

TOP FLANGE





Pos	Flange Size	Use	Comment
C1	CF200	DArT CHamber	
C2	CF40		
C3	CF100		
C4	CF40	Gas Recirculation Valve	
C5	CF100		
C6	CF40	LAr Snorkel	
C7	CF100		
C8	CF40		
C9	CF250	SCFT 1 from 3x1x1	
C10	CF100	VAT Valve + Vacuum Pump	
C11	CF200		
C12	CF100		
C13	CF40	Pressure Sensors Dewar	

Project:	Project Name									Scale	Tot Pages
Sub-Proj.:	Sub-Project Name									1:1	1
Assembly:	Assembly Group Name										
Created:	DD.MM.YYYY	Name	Dimensions	From	1	6	30	100	300	1000	Page N°
Last Mod.:	DD.MM.YYYY	Name		To	6	30	100	300	1000	2000	1
Constructed:	DD.MM.YYYY	Name	Tollerance		±0.1	0.2	0.3	0.5	0.8	1.2	

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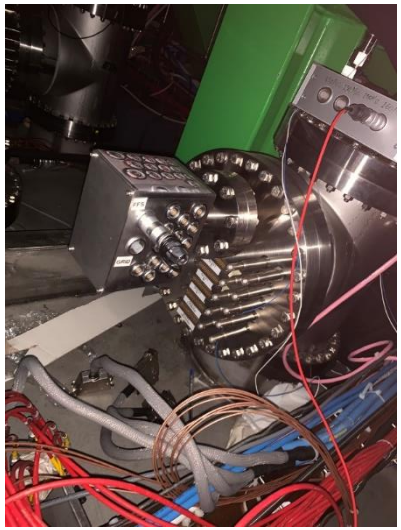
DArT Top Flange

XX-XXXX

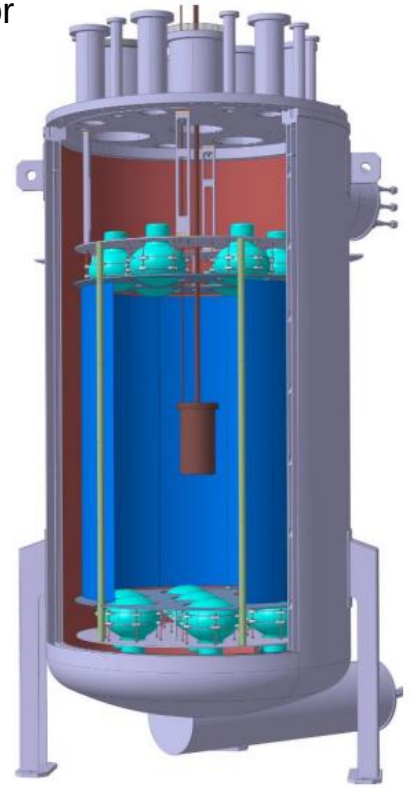


Pressure sensor

Capacitive LM

6 PMTs

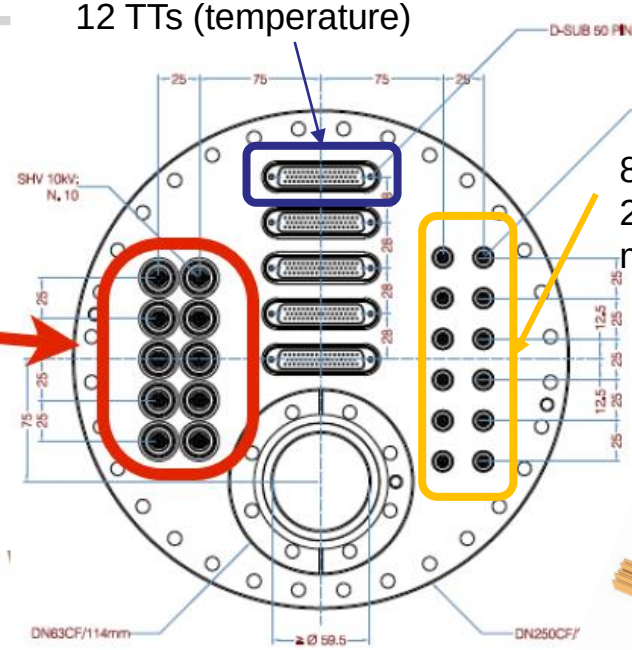
7 PMTs



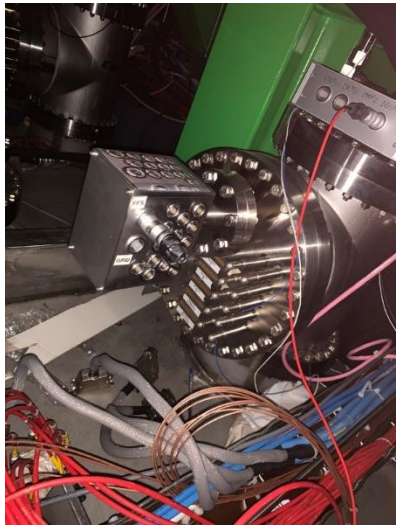
PMTs SIGNAL AND HV CONNECTION

12 TTs (temperature)

HV 10kV double ended not use in the 311 due to HV discharges
Here they will be used for PMTs signal
= 5 PMTs signal



8 PMTs signal
2 LTs signal (1 level meter)



13 HV connections for PMTs (directly molded inside dedicated flange)

DN250CF version currently in application (3m x 1m x 1m)

WORK AT LSC
&
ASSEMBLY PROCEDURE

1) Before Removing ArDM Detector:

- Remove Top Shield
- Disconnect/Dismantle from ArDM Flange:
  - Gas Recirculation
  - All Cables → Signal and Power
  - It is recommended to already dismantle the parts that have to me moved to DArT (see slide #6)

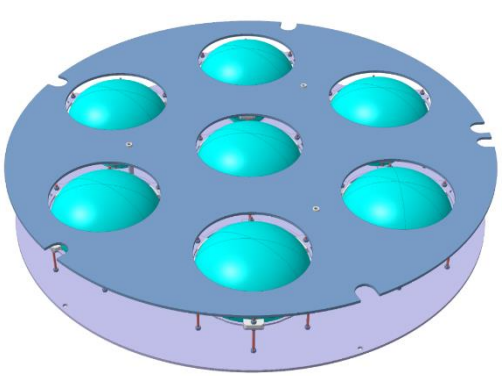
2) Extract ArDM Detector:

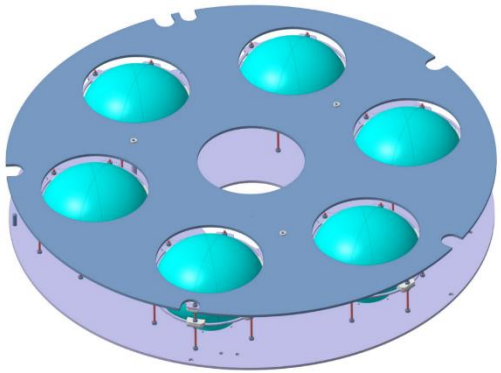
- Lifting jig for the Top Flange is in LSC
- Weight as lead bricks should be used to balance the Top Flange in order to lift the detector perfectly vertical
- ArDM Detector with Flange can has to be moved to the Existing shower structure in LSC
- PMT signal cables will be reused for DArT
- Remove well the residues of Indium sealing from the Dewar Flange
- Cover the Dewar (plastic cover/disk should be already in LSC
- Dismantle and put in boxes everything is needed for Dart (preventing to get dirty)

STEP 1:

- After everything described in the previous slide is ready, new detector assembly can start.
- New shower and new Top Flange is provided

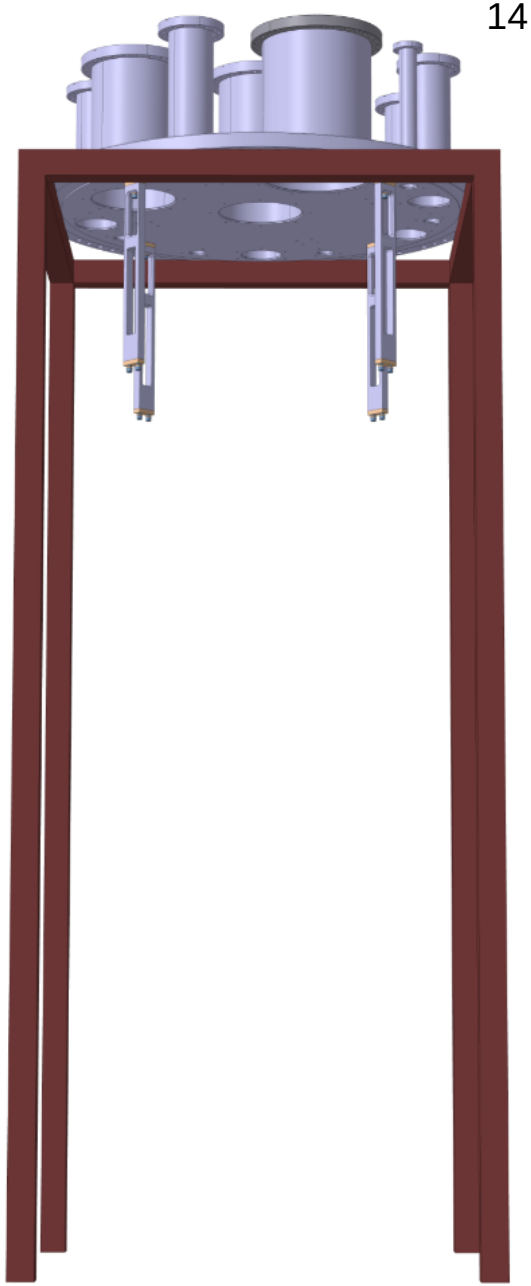
- Top and Bottom PMTs array are already assembled





STEP 1:

- Top Flange on the Support Shower
- 4x SS Pillar



STEP 2:

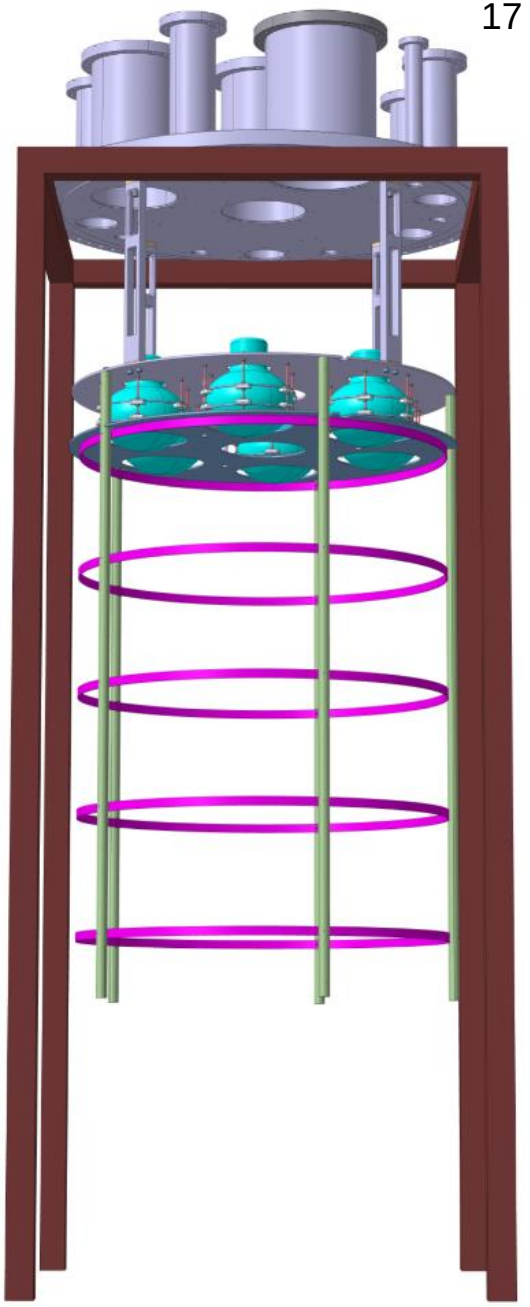
- Top PMTs array

STEP 3:

- 5 x Cu Pillars

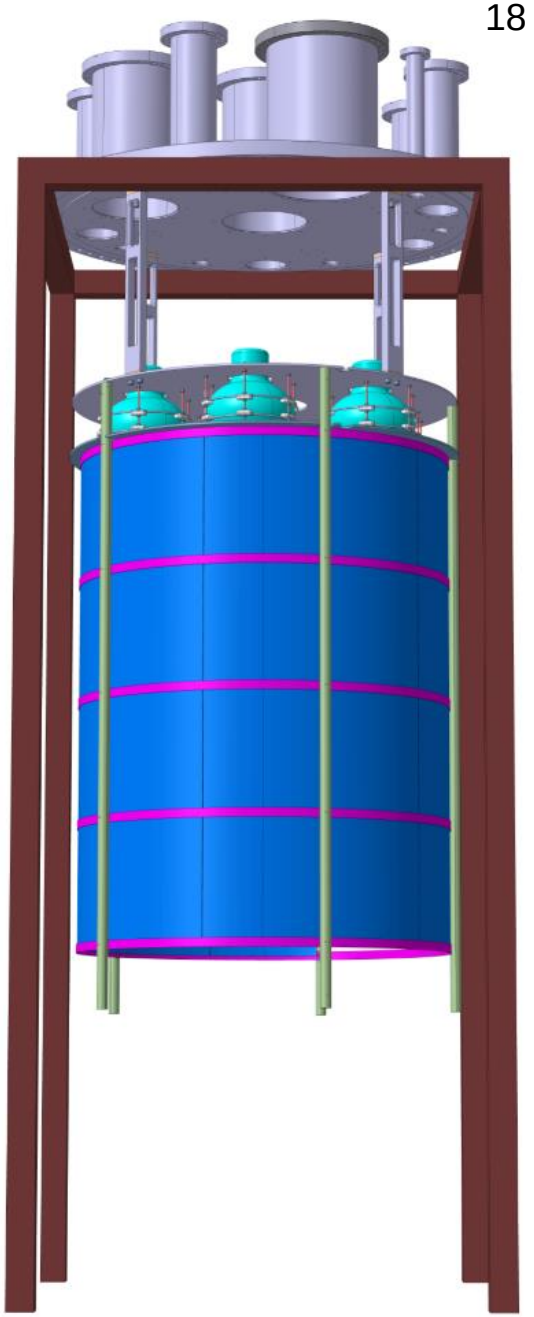
STEP 4:

- Vertical Reflector supports rings



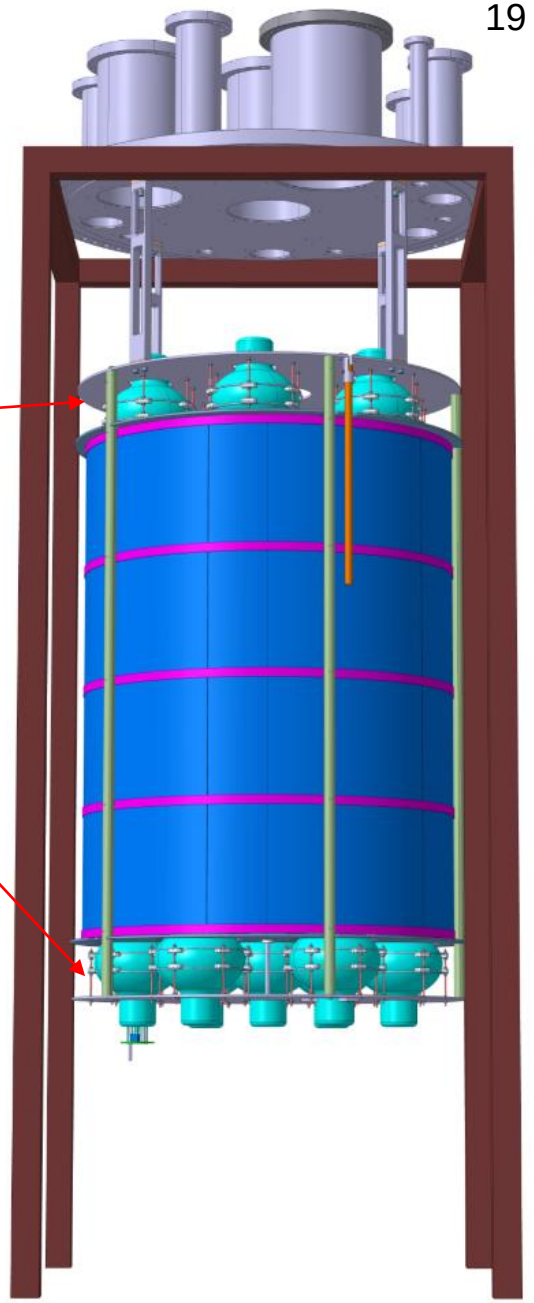
STEP 5:

- Vertical Reflector installed from inside



STEP 6:

- Bottom PMTs array
- Coaxial Levelmeter
- Cabling
- Cover Top and Bottom PMTs array with Teflon Tape



STEP 7:

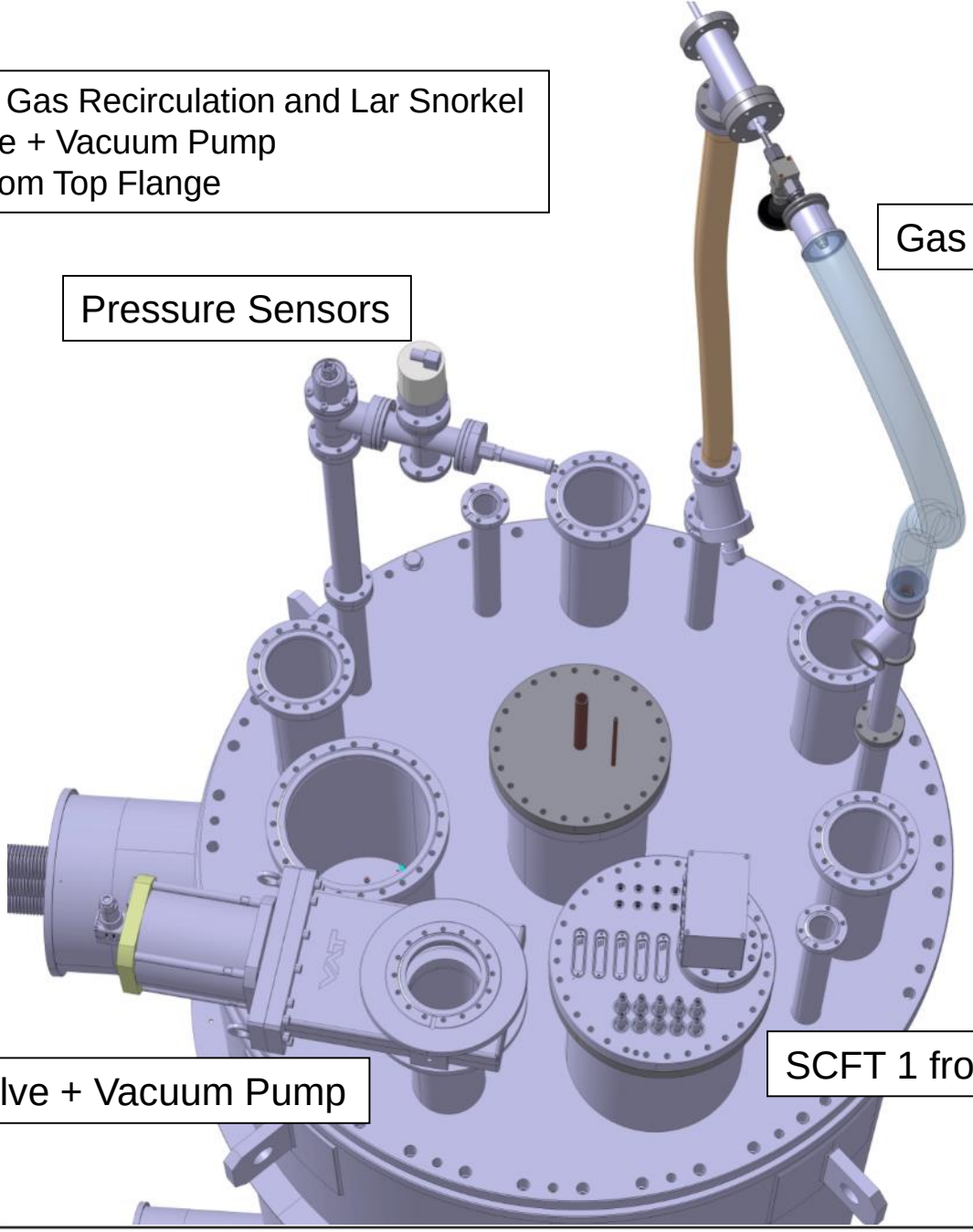
- PMT Cabling to the Top Flange
- Insert LAr Snorkel

STEP 8:

- Insertion in ArDM Dewar

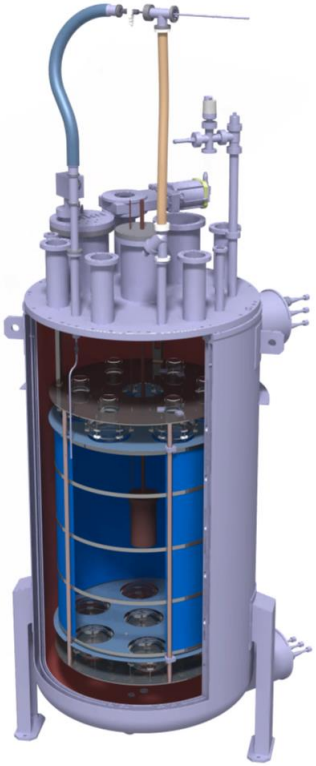
STEP 9:

- Connnect Gas Recirculation and Lar Snorkel
- Gate Valve + Vacuum Pump
- Cabling from Top Flange



Pressure Sensors

Gas Rec. and LAr snorkel



Gate Valve + Vacuum Pump

SCFT 1 from 3x1x1

Thank You