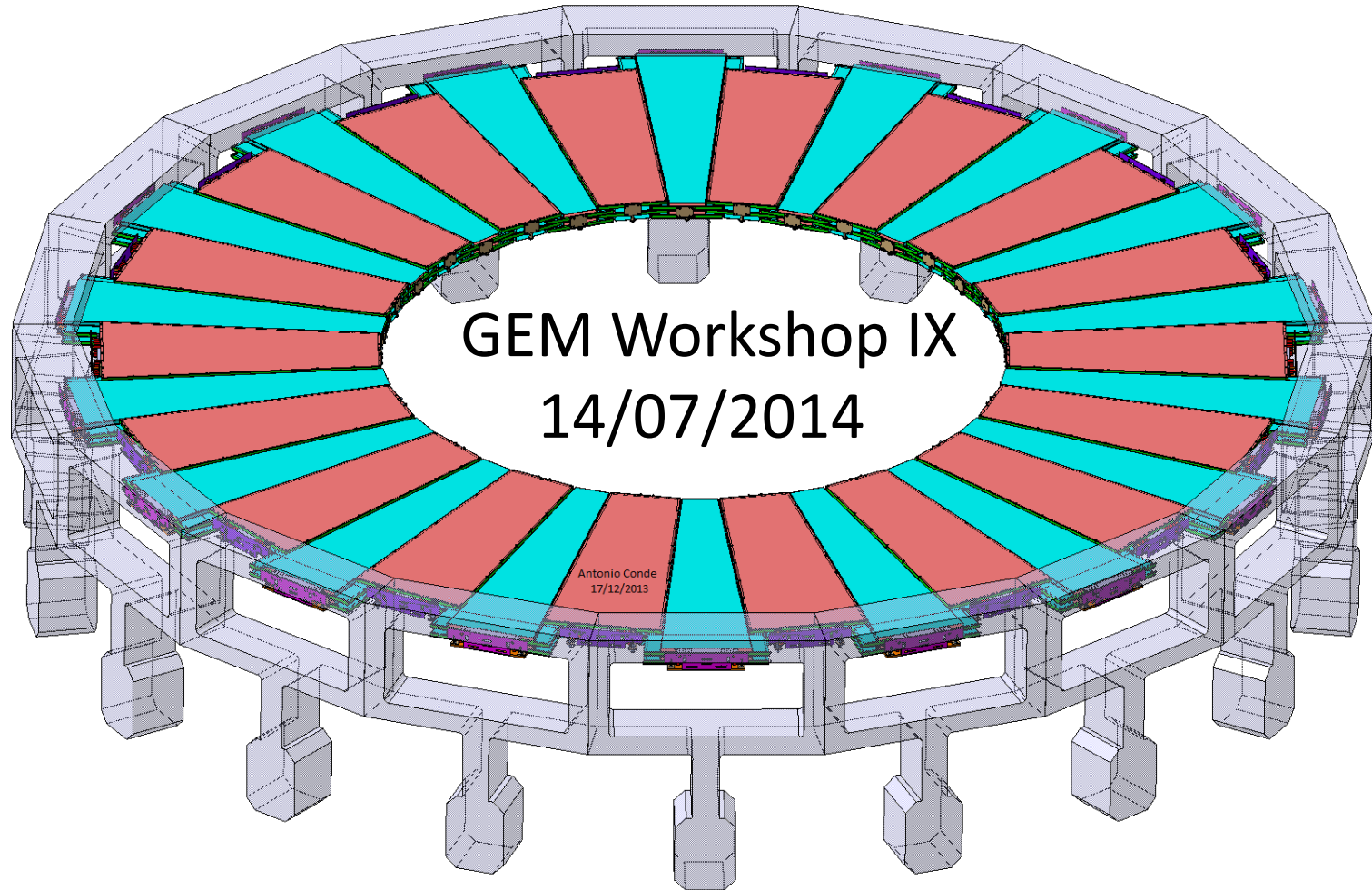
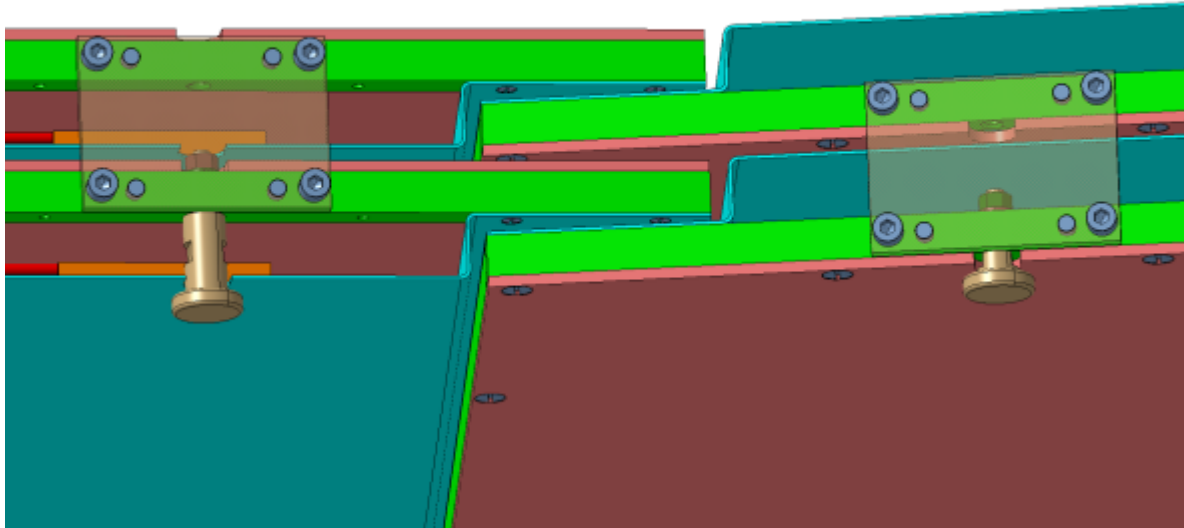


MECHANICS & 3D MODELLING



Antonio Conde CERN PH-CMX

GE 1/1



BARTHEL PHILIPPS (AACHEN): BILL OF MATERIALS MECHANICS COMPONENTS FOR DUMMIES
 (also valid for real Superchambers, excepting the first position)

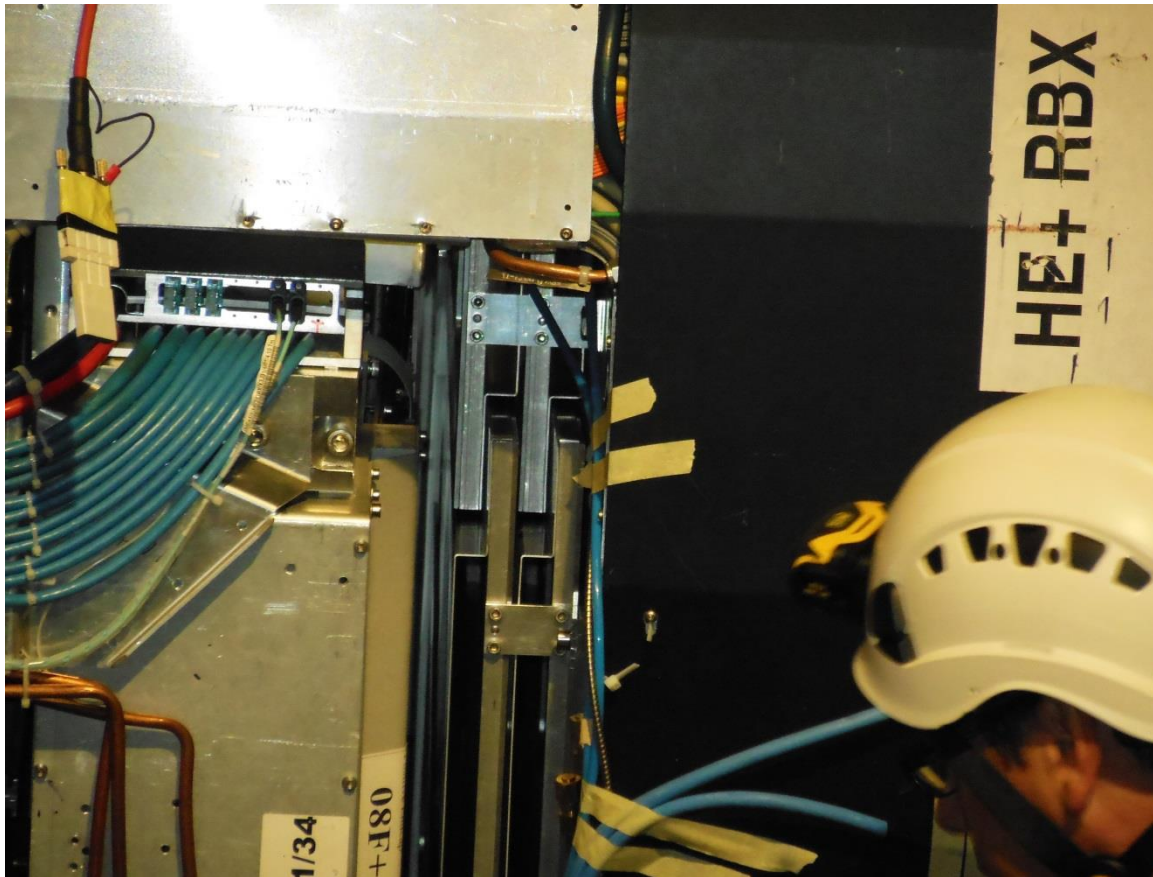
Pos.	Quantity	Description	Drawing / or / type number	DIN/ISO	Material	Supplier
1	2	Fake drift board long version	GEM-01-00573-R1-A0	/	Aluminium	RWTH
2	2	Frontend bar long version	GEM-01-00574-R1-A2	/	Aluminium	RWTH
3	2	Backend bar long version	GEM-01-00575-R1-A2	/	Aluminium	RWTH
4	2	Side bar long version 1	GEM-01-00576-R1-A0	/	Aluminium	RWTH
5	2	Side bar long version 2	GEM-01-00577-R1-A0	/	Aluminium	RWTH
6	2	Cover long version	GEM-01-00557-R1-A0	/	Aluminium	RWTH
7	2	Frontend bracket long version	GEM-01-00578-R1-A3	/	Aluminium	RWTH
15	1	Pivolt bolt long version	GEM-01-00579-R1-A3	/	Brass	RWTH
16	1	Bracket backend	GEM-01-00572-R1-A3	/	Aluminium	RWTH
17	1	Spacer plate longversion	GEM-01-00580-R1-A2	/	Aluminium	RWTH
18	2	Screw M12	GEM-01-00581-R1-A4	/	Brass	RWTH
19	8	Cylinder bolt 5H8 x 12		2338	A2	/
20	12	Hex socket head cap screw M5 x 12		912	A2	/
21	48	Slotted screw M3 x 10		963	A2	/
22	56	Slotted screw M4 x 12		962	A2	/
23	1	Nut M4		934	Brass	/

Pos.	Quantity	Description	Drawing / or / type number	DIN/ISO	Material	Supplier
1	2	Fake drift board short version	GEM-01-00565-R1-A0	/	Aluminium	RWTH
2	2	Frontend bar short version	GEM-01-00566-R1-A2	/	Aluminium	RWTH
3	2	Backend bar short version	GEM-01-00567-R1-A2	/	Aluminium	RWTH
4	2	Side bar short version 1	GEM-01-00568-R1-A1	/	Aluminium	RWTH
5	2	Side bar short version 2	GEM-01-00569-R1-A1	/	Aluminium	RWTH
6	2	Cover short version	GEM-01-00558-R1-A0	/	Aluminium	RWTH
7	2	Frontend bracket short version	GEM-01-00570-R1-A3	/	Aluminium	RWTH
15	1	Pivolt bolt short version	GEM-01-00571-R1-A3	/	Brass	RWTH
16	1	Bracket backend	GEM-01-00572-R1-A3	/	Aluminium	RWTH
17	8	Cylinder bolt 5H8 x 12		2338	A2	/
18	12	Hex socket head cap screw M5 x 12		912	A2	/
19	44	Slotted screw M3 x 10		963	A2	/
20	52	Slotted screw M4 x 12		962	A2	/
21	1	Nut M4		934	Brass	/

- THE 3 **DUMMIES** INSERTED ON 22/04/2014 IN «+» SIDE, HAVE BEEN REMOVED ON 03/07/2014 (IAN'S TALK)

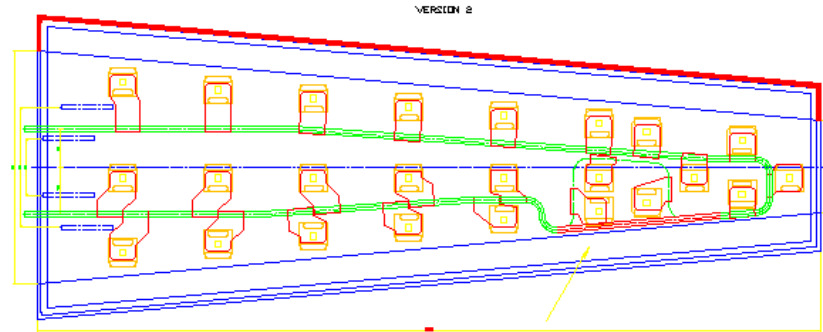
✓ NO MECHANICAL INTERFERENCES

- BUT SOME DIFFICULTIES FOUND, LIKE IN THE PREVIOUS 2013 TRIAL IN «-» SIDE



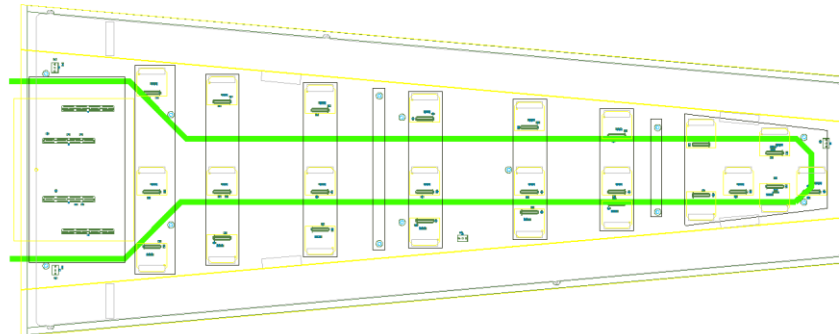
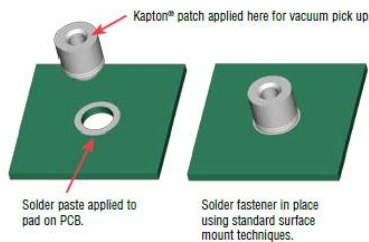
INNER COOLING PIPE

- GEORGI RASHEVSKI (I. N. R. N. E., SOFIA) IS DESIGNING THE COOLING PIPE ACCORDING TO THE NEW GEOMETRIES AND THE 90° ROTATION OF THE VFAT CONNECTORS:



- JOONAS TALVITIE HAS PROVIDED A MECHANICAL SOLUTION AND FIXATION POINTS TO ATTACH COOLING PIPE TO GEB:

INSTALLATION - NUTS AND SPACERS



- CURRENTLY CLARIFYING WITH YIFAN YANG POSITION & DIMENSIONS OF THE OPTICAL BOARD AND ALSO WHICH OF THE COMPONENTS NEED COOLING

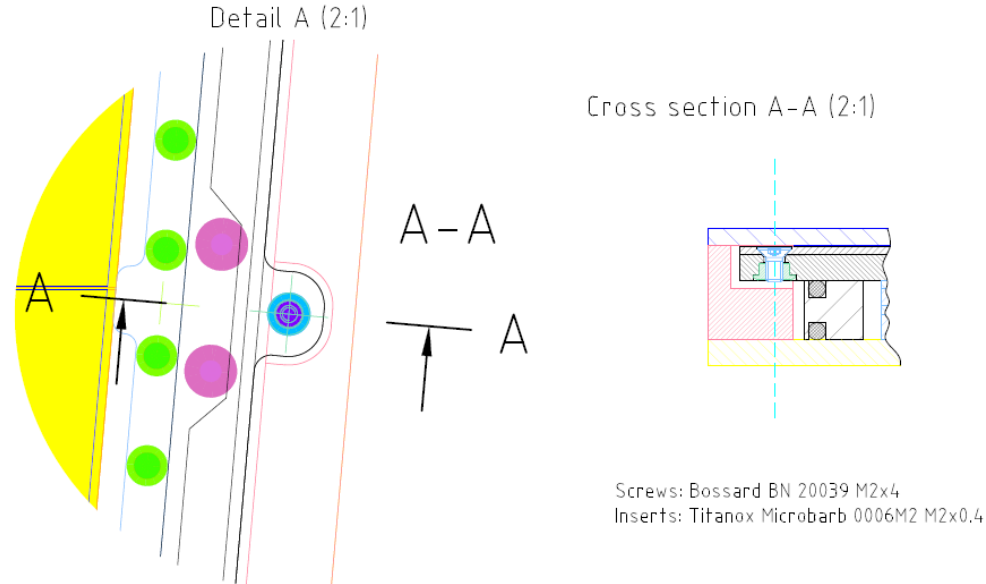
THEN **NEXT STEPS** WILL BE: 1/«FINALISE» DESIGN, 2/SIMULATIONS ON FLUID PERFORMANCE AND THERMAL EXPANSION , 3/MANUFACTURING 1st PROTOTYPE, 4/TESTS

→ **NEEDS THE PARTICIPATION OF ALL THE STAKEHOLDERS**

G.E.B. IMPLICATIONS ON MECHANICS

- BY REQUEST OF JOONAS TALVITIE, GEB NOW IS 24mm SHORTER THAN READOUT BOARD, DUE TO MANUFACTURING LIMITATIONS (see picture in next slide)
- ALUMINIUM FRAME HAS TO BE MODIFIED (6 MACHINED POCKETS) DUE TO NEW GEB FIXATIONS BETWEEN GEB AND READOUT BOARD:

(Kacper Kapusniak's drawing)

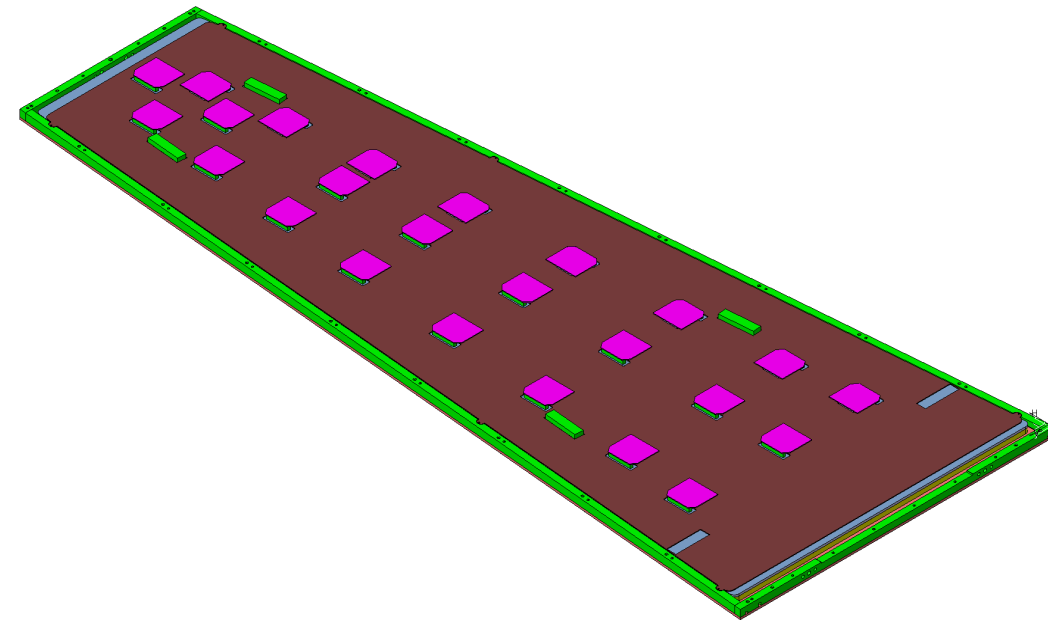
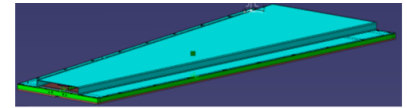


- 6 WINDOWS OPENED ON GEB, FOR ALIGNMENT SENSORS (see picture in next slide)



STUDENT MAYANK GAURAV , FROM *DURGAPUR INSTITUTE OF TECHNOLOGY*, 2 MONTHS INTERNSHIP SPENT TO HELP UPDATING INTERNAL COMPONENTS IN THE 3D MODEL

Designing of full size Triple Gem based Super Chamber for CMS, CERN

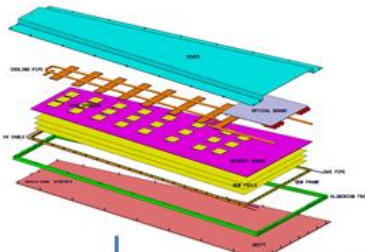
By
Mayank Gaurav
11/ME/50
NIT Durgapur, INDIA



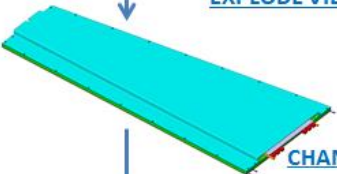
NEW POSTER DESCRIBING GE 1/1


CMS GEM PROJECT - GE1/1
3D MODELS


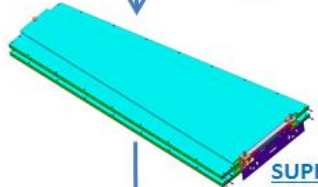
ANTONIO CONDELLA



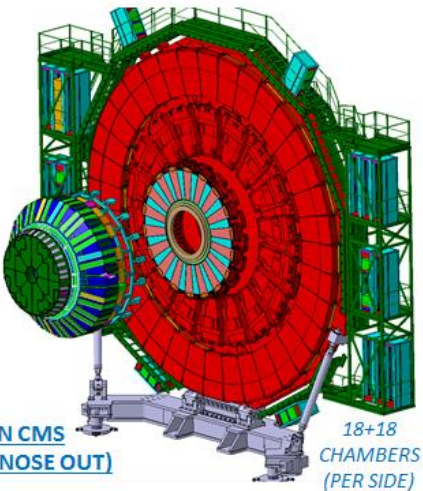
EXPLODE VIEW



CHAMBER




**SUPERCHAMBER
(2 CHAMBERS)**




**IN CMS
(NOSE OUT)**

**18+18
CHAMBERS
(PER SIDE)**

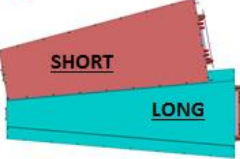
**DETAIL OF
THE COOLING:**



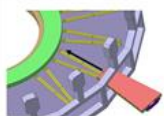
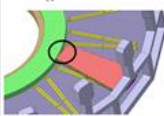
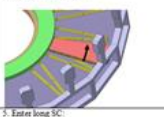
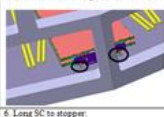
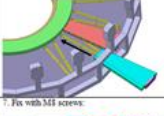
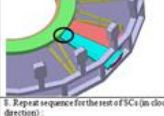


**GEM PARTITIONS &
HV SUBDIVISIONS:**



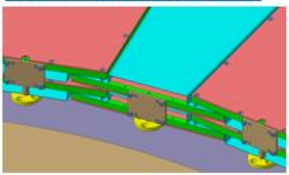
**2 TYPES OF
CHAMBERS:**



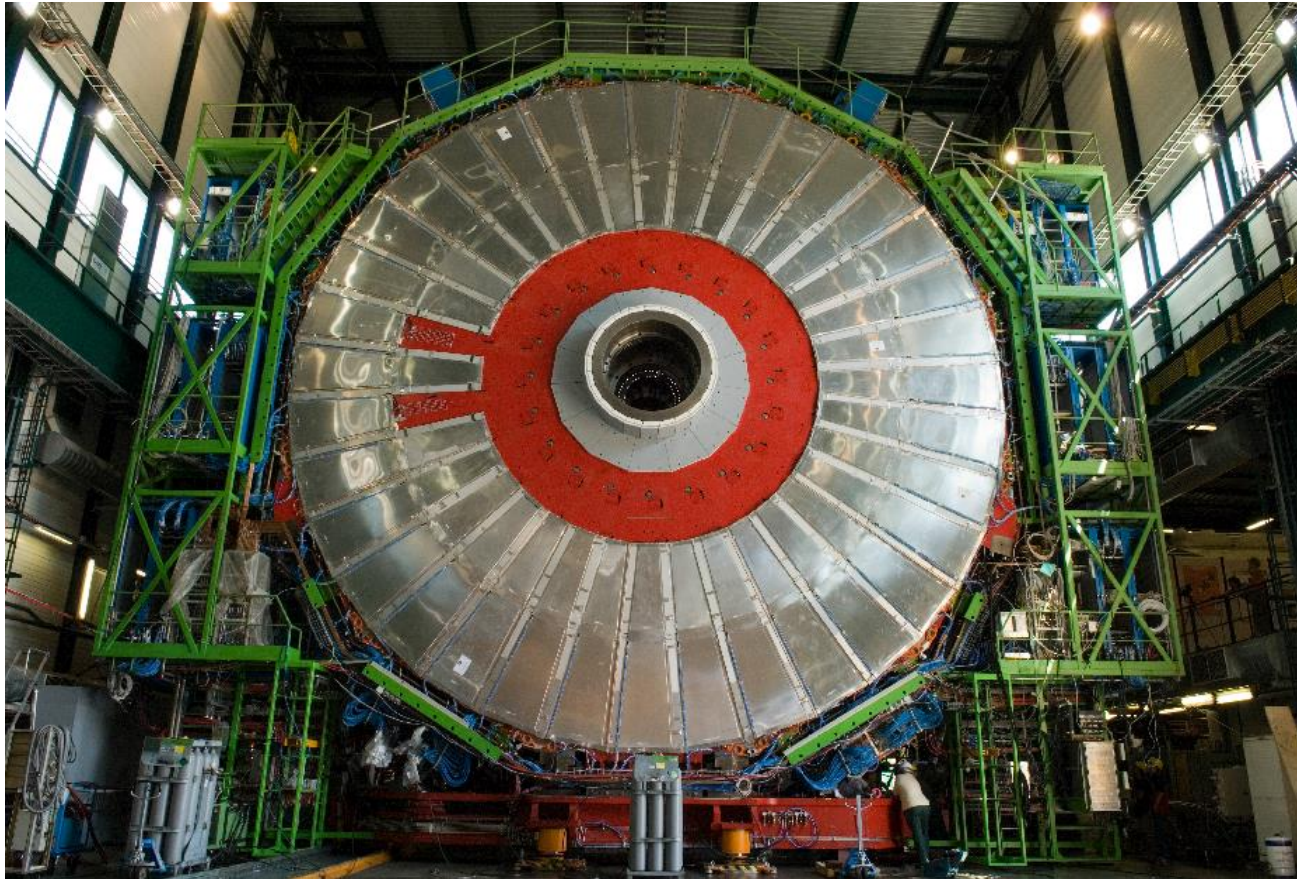
INSTALLATION:

<p>1. Enter short SC:</p> 	<p>2. SC to stopper:</p> 
<p>3. Rotate 9° short SC:</p> 	<p>4. Fix to the Back-Flange with M12 screws:</p> 
<p>5. Enter long SC:</p> 	<p>6. Long SC to stopper:</p> 
<p>7. Fix with M1 screws:</p> 	<p>8. Repeat sequence for the rest of SCs (in clockwise direction):</p> 

SANDWICH DISPOSITION:



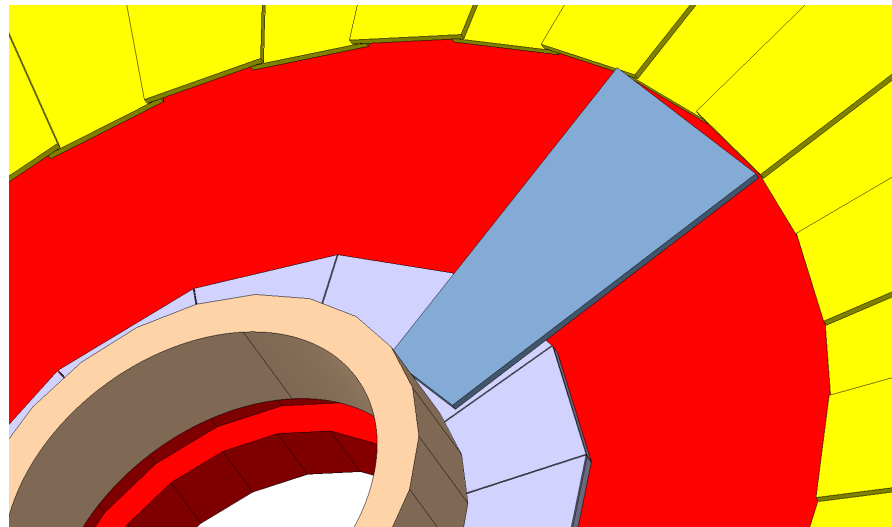
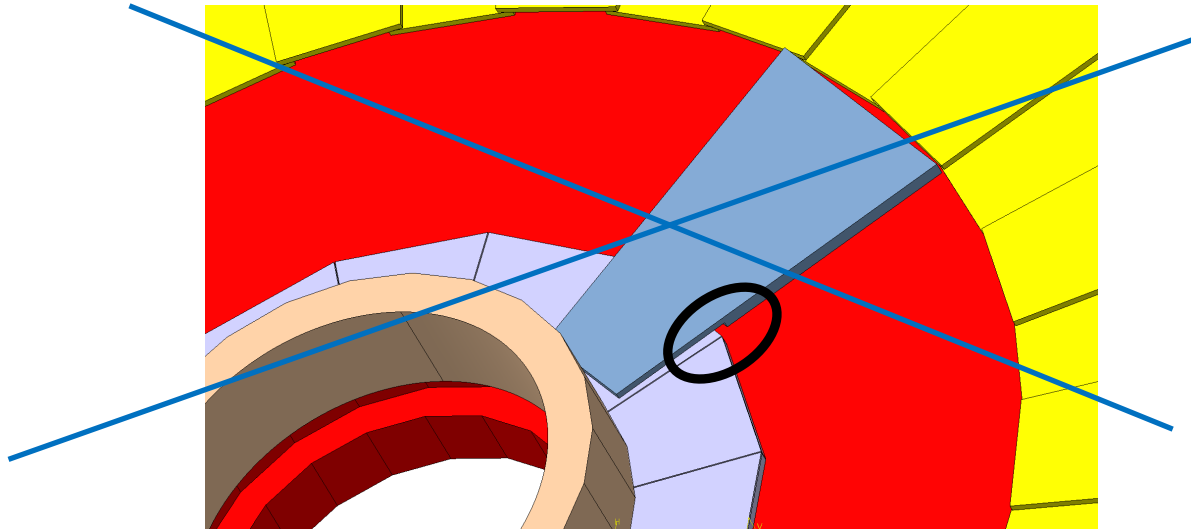
GE 2/1



ALIGNMENT DCOPS EXPECTED TO BE REMOVED

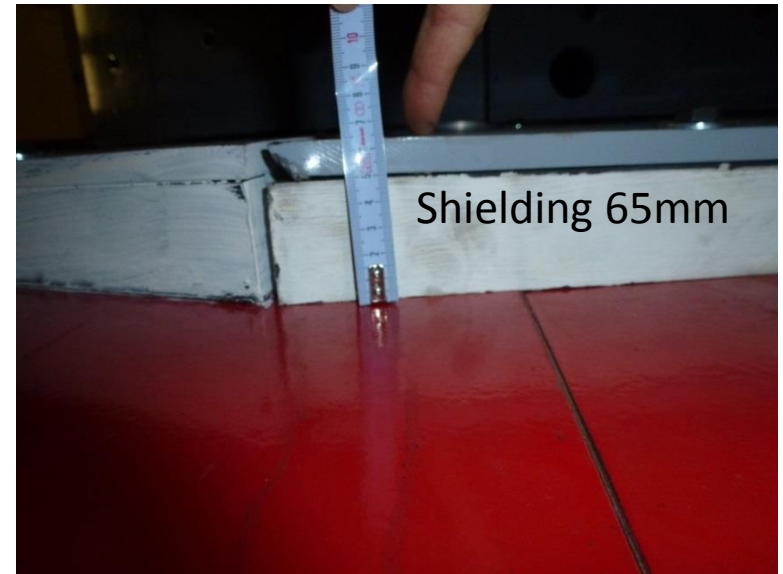


IT WILL ALLOW US MOUNTING FULLY LONG GEMs COVERING FROM 1.6 TO 2.4 ETA



BUT WE HAVE TO DEAL WITH THE LIMITED ENVELOP

DISTANCE FROM YOKE TO CSC CHAMBERS: 147mm
SHIELDING: -65mm
GAP: 82mm
SAFETY MARGIN: -5mm
77mm



THEN, (to be confirmed by the relevant persons) CONSERVATIVE ENVELOP WITH NO DCOPS IS **77mm** (for GE 1/1 is 74mm)

DIFFICULTIES TO BE STUDIED:

- COMPARED TO GE 1/1, MUCH BIGGER DIMENSION OF THE SUPERCHAMBERS (1911X1250mm)
→ NEED TO INCREASE THE THICKNESS OF THE BOX, REINFORCE THE DRIFT, ETC.?
- HOW TO FIX TO THE YOKE WHILE KEEPING THE OVERLAP IN SUCH A DOUBLE SANDWICH STRUCTURE
→ WITH RAILS, LIKE IN GE 1/1?

THANKS

Antonio Conde CERN PH-CMX