

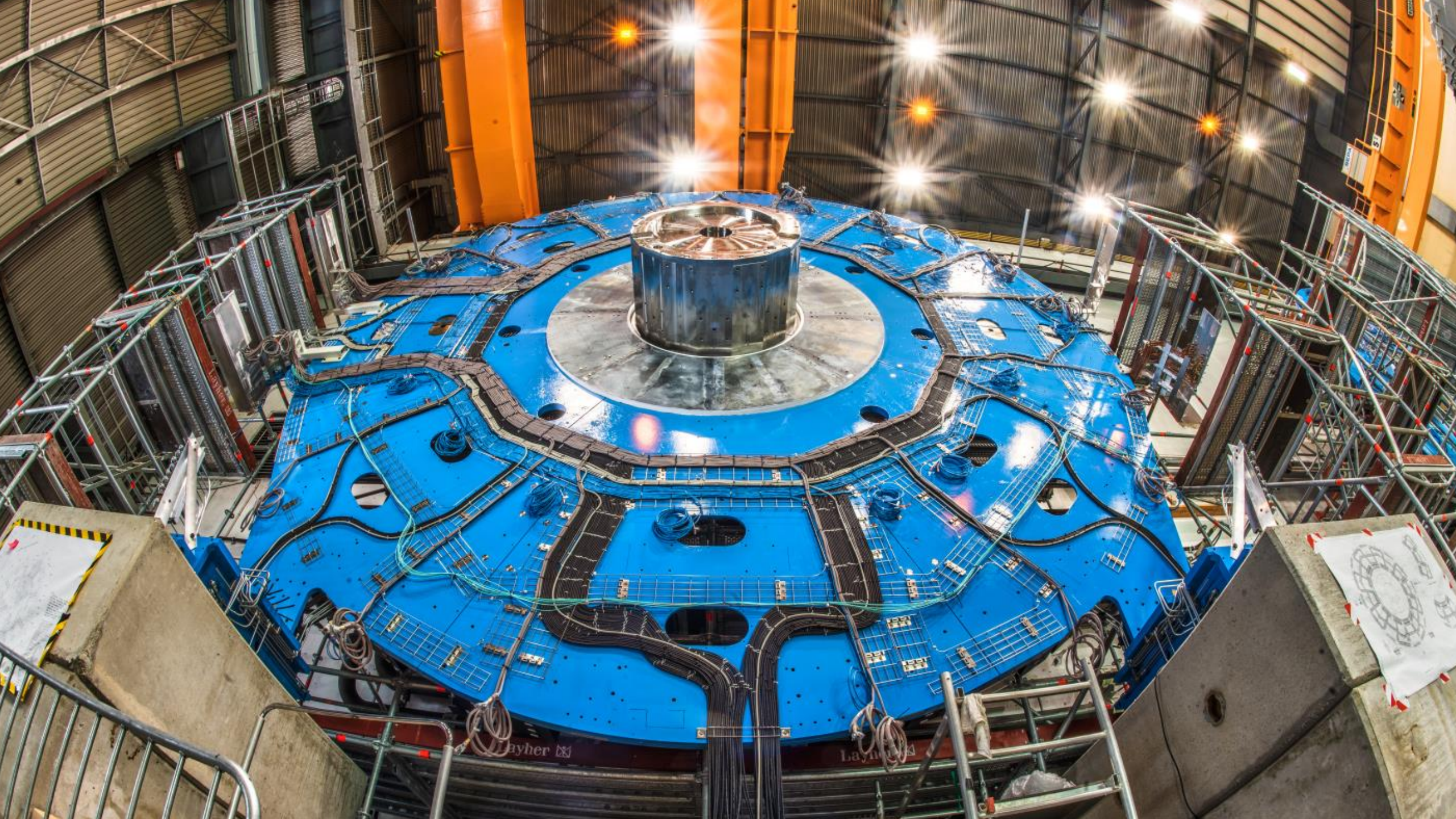
THE FUTURE OF ATLAS

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The ATLAS New Small Wheel Upgrade Project

To continue exploring the frontiers of particle physics following the discovery of the Higgs boson, the LHC experiments are preparing to enter a new era: a major upgrade to the LHC, known as the High-Luminosity LHC, is scheduled to come online in 2026. It will increase the luminosity of the collider, delivering more collisions and allowing the experiments to probe phenomena that are even rarer in nature.



The High-Luminosity LHC

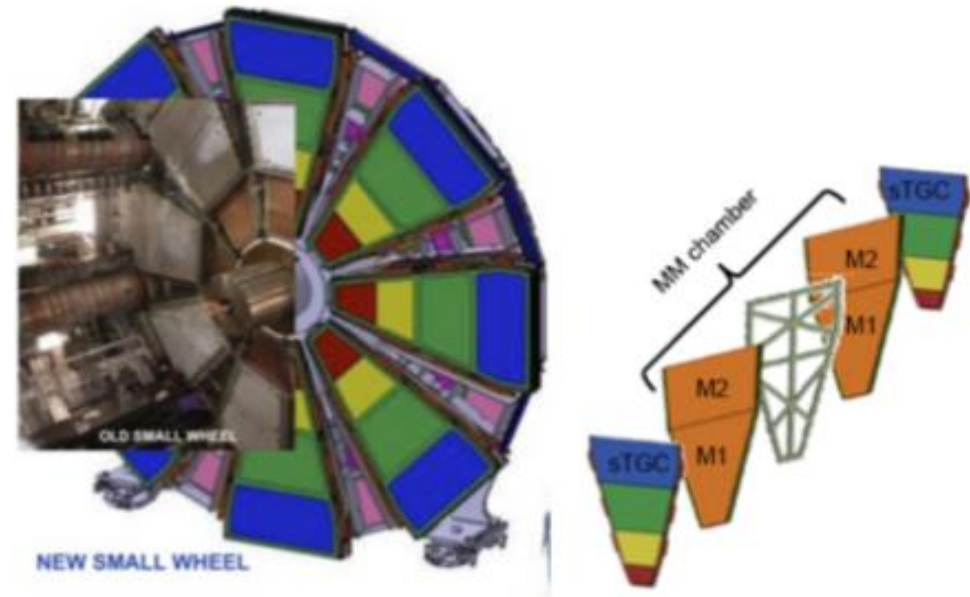
Why is it important ?

Luminosity is an important indicator of the performance of an accelerator: it is proportional to the number of collisions that occur in a given amount of time. The higher the luminosity, the more data the experiments can gather to allow them to observe rare processes. The High-Luminosity LHC, which should be operational as from 2026, will allow physicists to study of known mechanisms in greater detail, such as the Higgs boson, and observe rare new phenomena that might reveal themselves.



DETECTOR LAYOUT

The NSW will utilize two detector technologies: small-strip Thin Gap Chambers (sTGC) as the primary trigger and Micromegas (MM) as the primary precision tracker. The NSW consists of 16 detector planes arranged in two multilayers. Each multilayer comprises four sTGC and four MM detector planes. A sandwich arrangement of sTGC-MM-MM-sTGC is used to maximize the distance between the two sTGCs multilayers for improved track segment angular resolution at the trigger level.



How detectors work?

Accelerators at CERN boost particles to high energies before they are made to collide inside detectors. The detectors gather clues about the particles-including their speed, mass, and charge - from which physicists can work out a particle's identity. The process requires powerful electromagnets, and layer upon layer of complex subdetectors.

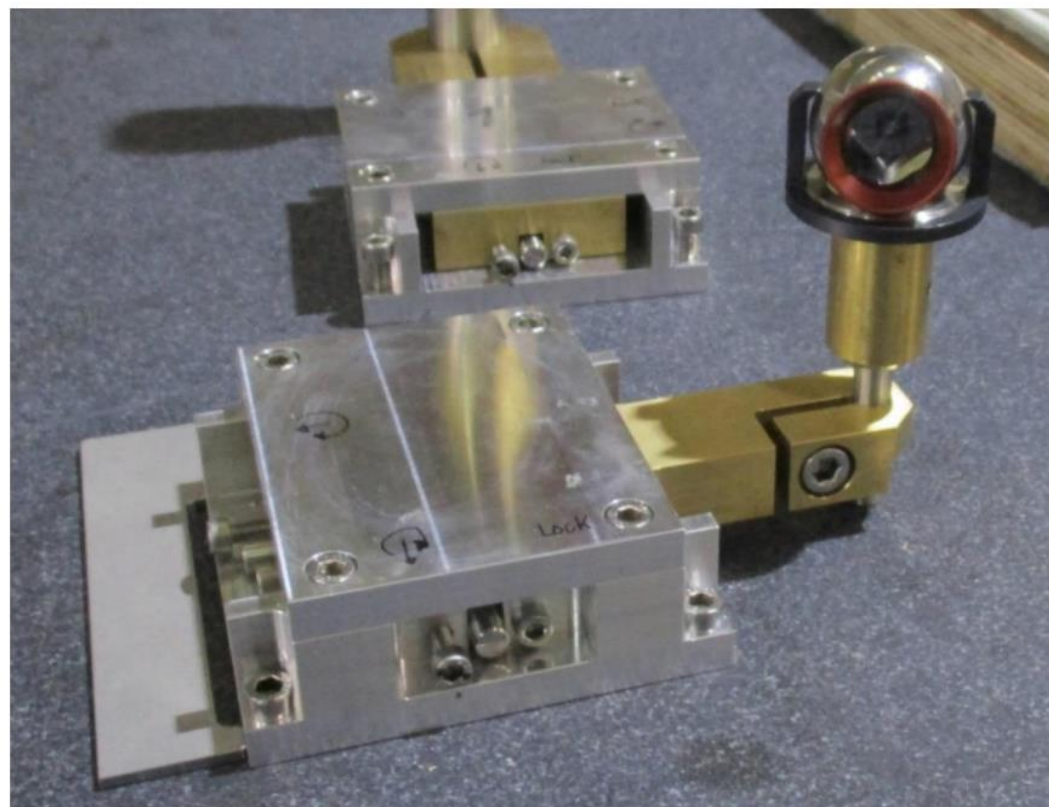
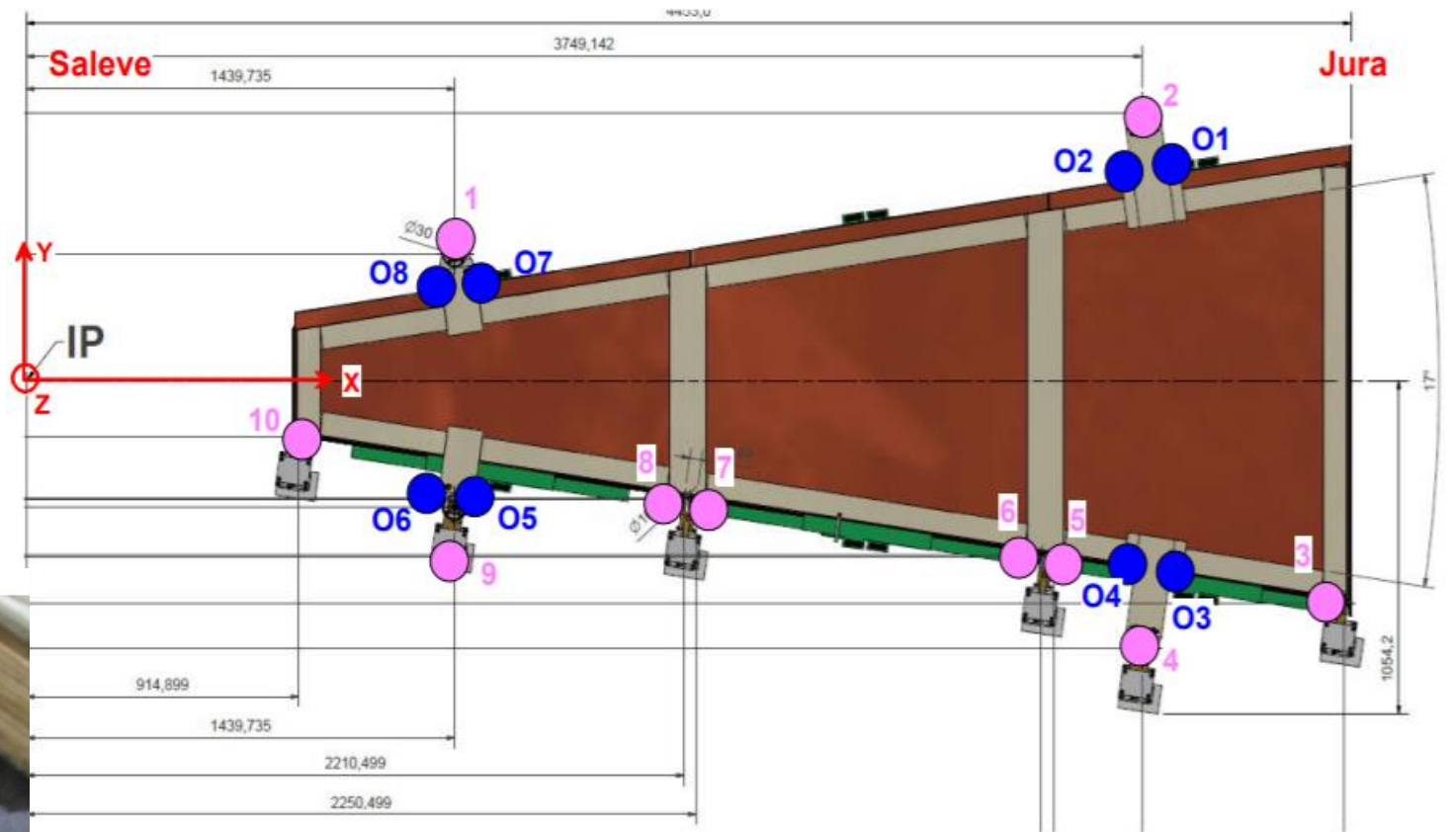


The ATLAS collaboration has taken a major step towards preparations for this phase with the completion of the two mechanical support discs for its New Small Wheel (NSW) upgrade, which were unveiled recently. When the scaffolding used during their assembly was removed. This upgrade project targets completion over the course of the second Long Shutdown of the LHC, in 2019 and 2020.



Measurements





RESULTS OF THE MEASUREMENT

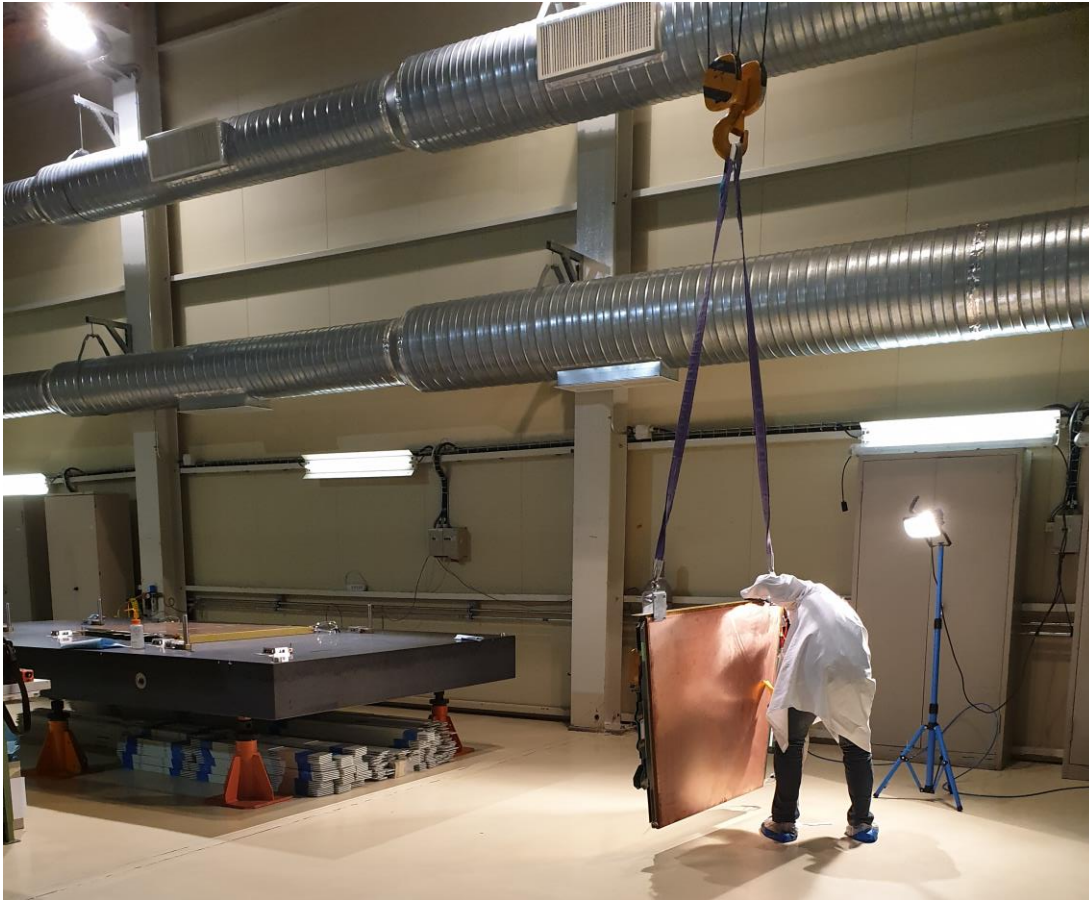
The pins 5+6 as well as 7+8 are physically linked together and it is impossible to adjust the distance between them. After a discussion with George Mikenberg it has been decided to take the pins 5 (respectively 8) have been taken as reference. The pins 6 and 7 have been adjusted on the theoretical line passing by the pins 3, 5, 6, 7 and 8. The mean line calculation in paragraph 4.2 shows that the projection of the coordinates for pins 3, 5, 6, 7 and 8 are on a straight line. The physical link of the pins 5+6 and 7+8 is the explanation for the differences in X-direction after adjustment of 0.16 mm and 0.15 mm. None of the pins has been adjusted in vertical direction.

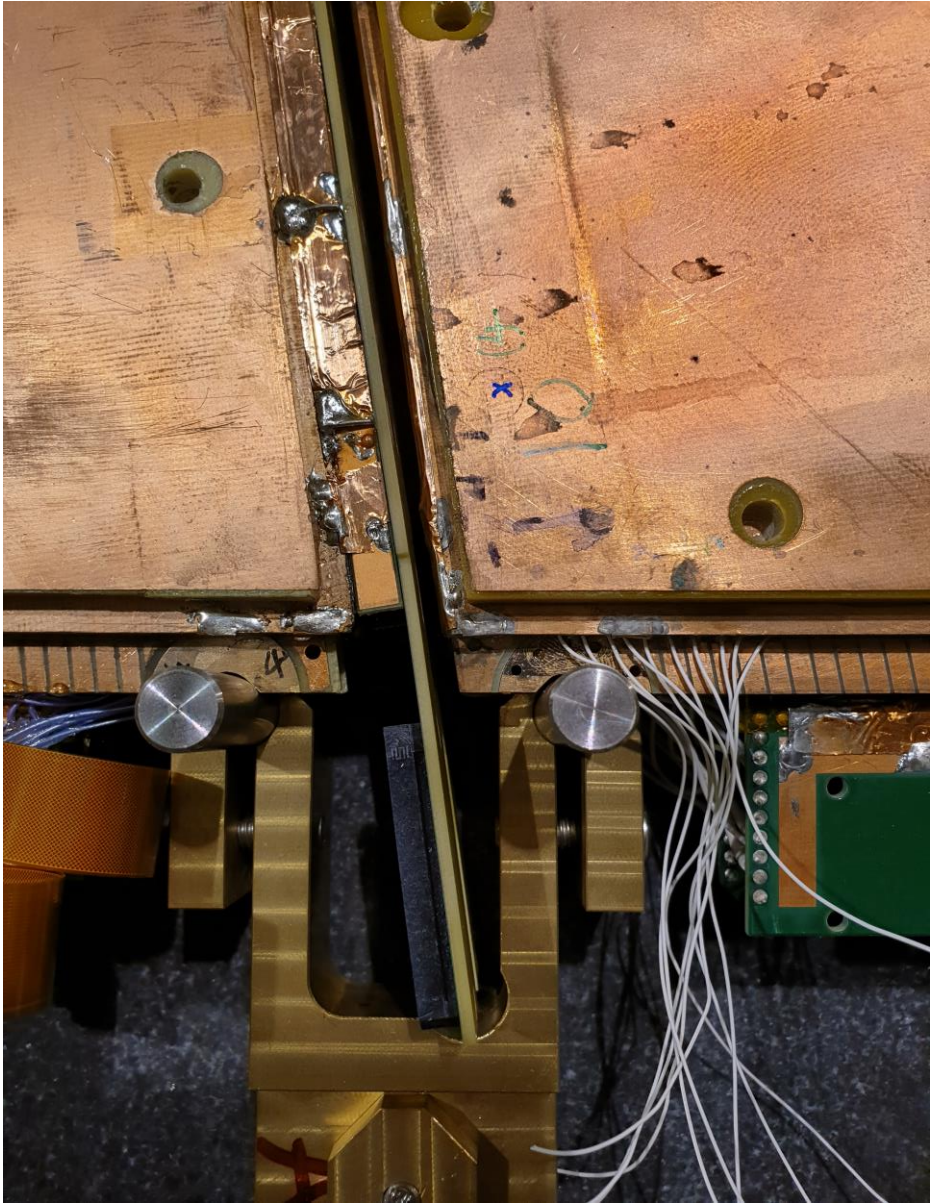
The deviation with respect to the theoretical values in Z-direction are within +/-0.12 mm



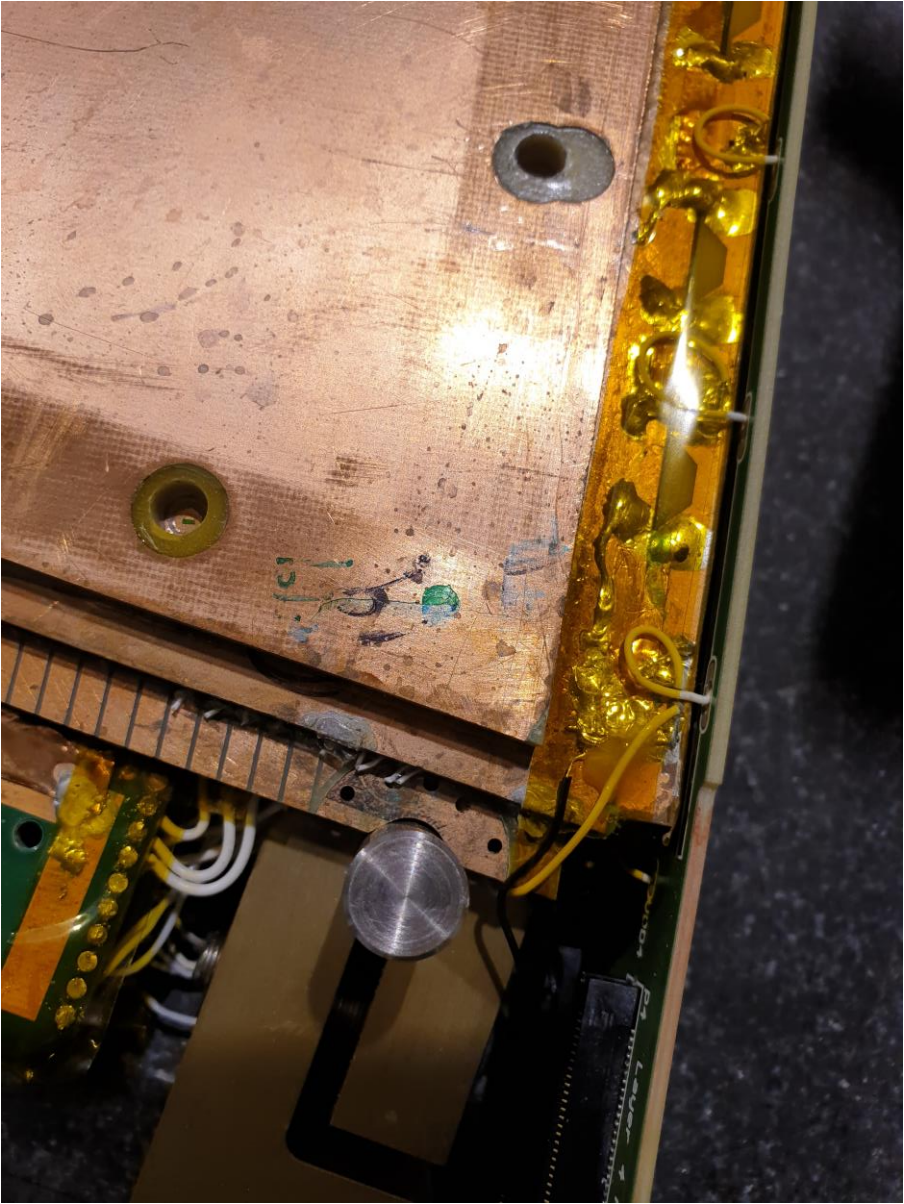
ATLAS - NSW Measurement (18.10.2018)										
Adjustment of pins for Small sTGC Wedges on Granite Table in B180 clean room										
Measured points				Theoretical points				Measured - Theoretical		
Name	Xloc (m)	Yloc (m)	Zloc (m)	Name	Xtheo (m)	Ytheo (m)	Ztheo (m)	DiffX (mm)	DiffY (mm)	DiffZ (mm)
1S	1.43976	0.39969	0.22703	1S_THEO	1.43974	0.39970	0.22700	0.02	-0.01	0.03
2S	3.74912	0.84588	0.22700	2S_THEO	3.74914	0.84595	0.22700	-0.02	-0.07	0.00
3S	4.42703	-0.70310	0.08191	3S_THEO	4.42710	-0.70313	0.08200	-0.07	0.03	-0.09
4S	3.74912	-0.84593	0.22712	4S_THEO	3.74914	-0.84595	0.22700	-0.02	0.02	0.12
5S	3.45438	-0.55773	0.08198	5S_THEO	3.45430	-0.55774	0.08200	0.08	0.01	-0.02
6S	3.40882	-0.55094	0.08197	6S_THEO	3.40890	-0.55096	0.08200	-0.08	0.02	-0.03
7S	2.25064	-0.37784	0.08204	7S_THEO	2.25050	-0.37783	0.08200	0.14	-0.01	0.04
8S	2.21049	-0.37180	0.08203	8S_THEO	2.21050	-0.37185	0.08200	-0.01	0.05	0.03
9S	1.43970	-0.39974	0.22705	9S_THEO	1.43974	-0.39970	0.22700	-0.04	-0.04	0.05
10S	0.91490	-0.17822	0.08188	10S_THEO	0.91490	-0.17822	0.08200	0.00	0.00	-0.12

sTGC Installation

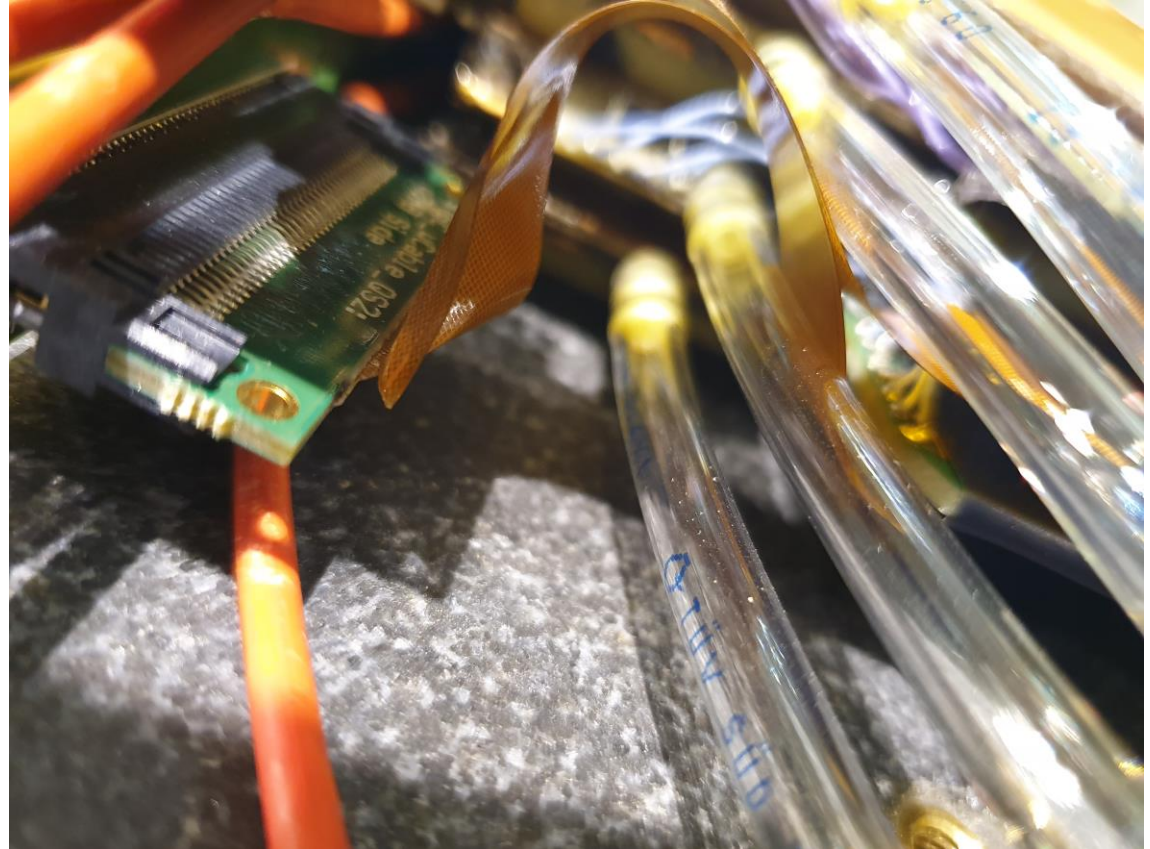




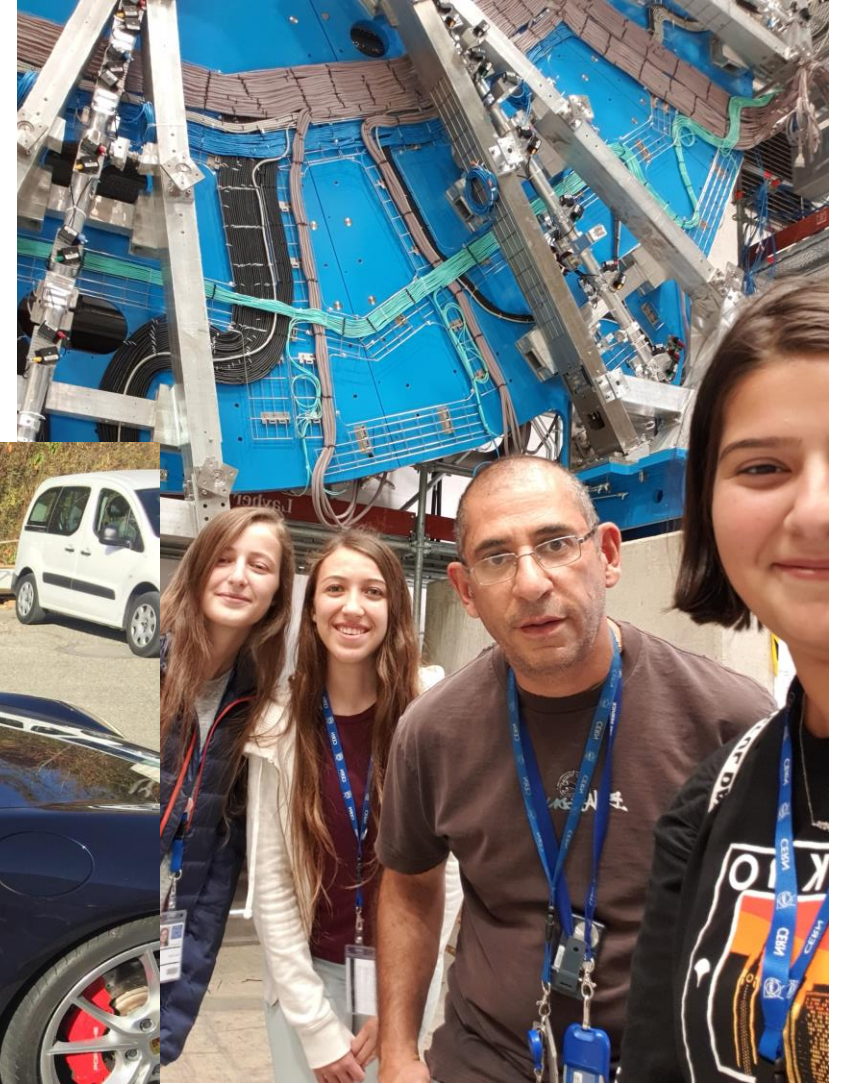
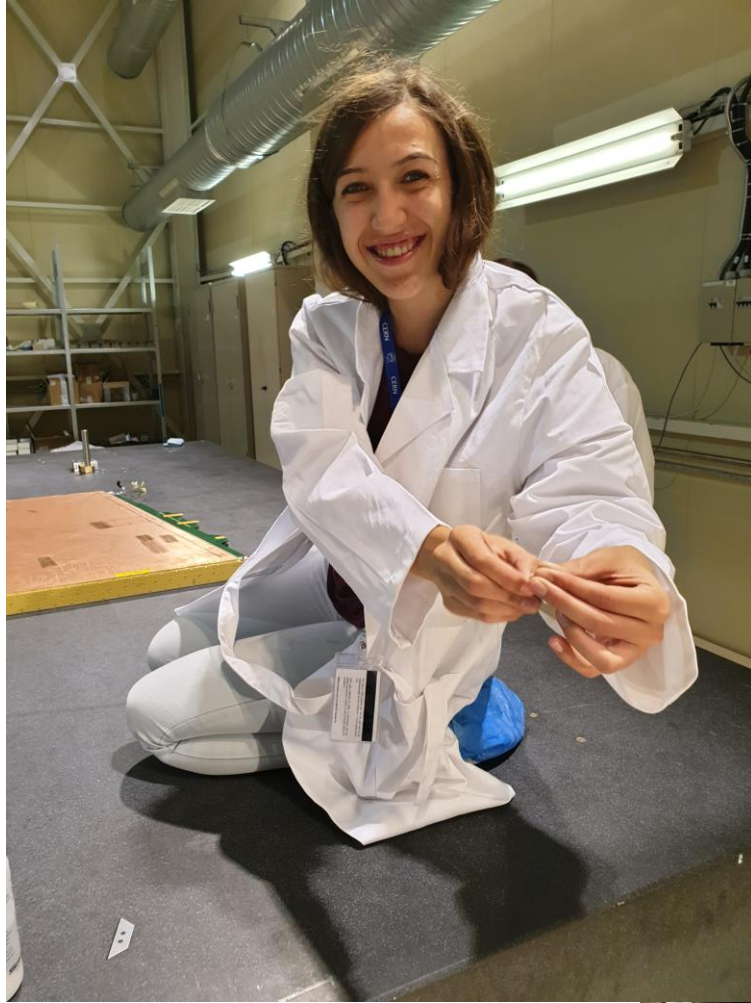
Check



Find mistakes



And having fun (:





Thank You !

