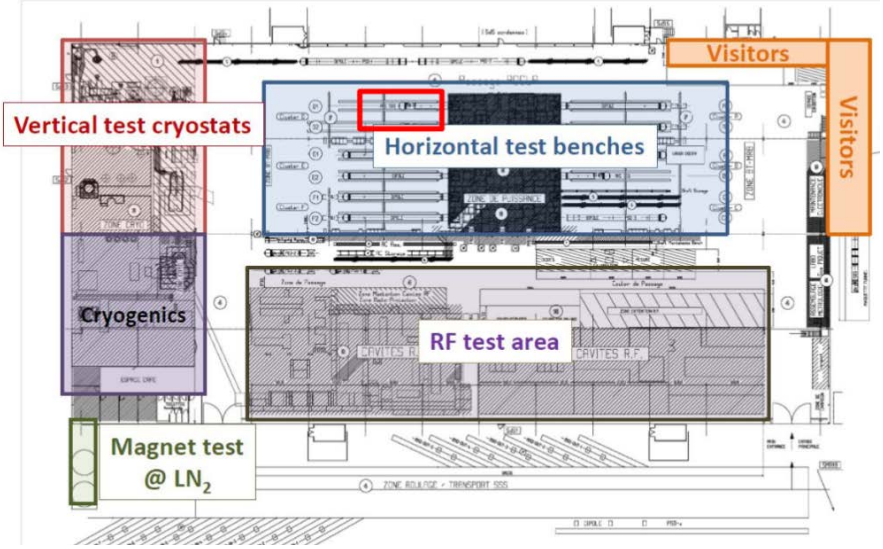
SM18 – LHC Test Facility

The hall SM18 (building 2173) is used to test accelerator components for the LHC, like superconducting magnets and RF cavities/modules, and measure their performance, under power and in superconducting conditions.
It is also being used to assemble or refurbish RF components in two clean rooms.



Superconducting magnet coil prototypes can be tested in the vertical cryostats. Horizontal test benches are designed to qualify complete magnets with cryostats. The RF area serves for testing superconducting RF cavities. To shield operators from the X-rays generated from new cavities, they are housed in concrete bunkers.
A cryogenic plant for liquefaction of Helium serves the different test areas with a production rate of more than 20 g s^{-1} of lHe.

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Synchrocyclotron, Bldg. 300

The 600-MeV proton synchro-cyclotron (SC) was the first accelerator designed and built at CERN. The SC energy was suggested by Enrico Fermi. The design of the machine started in 1953, before CERN came into existence. The machine started operation in August 1957 and the experimental program in April 1958. Apart from an interruption to undergo a major upgrade in the early 1970s, the accelerator had been in operation for 33 years until it was shut down in 1990, providing a wealth of physics results. Just to mention one thing, the first bubble chamber used at CERN was operated at the SC.

The SC initially served two experimental rooms located on both sides of the accelerator hall: the proton hall and the neutron hall. Experiments were done both with protons and with secondary particles (pions, muons and neutrons). Protons were extracted from the accelerator and delivered via beam transfer lines to the proton hall. You see the first part of the transfer line with the first focussing quadrupoles on the left side of the accelerator. An internal target was used for producing secondary particles, located on the other side of the accelerator with respect to the extraction system. In 1964 the ISOLDE facility was approved, a new underground experimental hall was built and experiments started in 1967. ISOLDE was transferred to its present location at the PS Booster when the SC was shut down.

The main particle physics results achieved at the SC are: the first observation of the electron decay of the pion, which proved an important prediction of the weak interaction theory; the first precision measurement of the muon anomalous magnet moment; the first exact measurement of the decay rate of the positive pion into a positron, neutrino and neutral pion; the muon capture in hydrogen.

You access the accelerator hall via a new entrance to building 300, which is a “timeline” taking visitors back in time from today to 1954. To enter the 300 m^2 hall you traverse a 4 m thick shielding wall. The visit area is defined by the metallic floor and confined by the glass barriers. The original floor is seen outside the visitors’ path. The section of the floor close to the entrance has been removed so that visitors can see the entire accelerator. The section of the wall on the left of the entrance is in fact a sliding door, which was driven by the large motor attached to the door. There is a 50 t overhead crane on the roof.

Around the hall there are old objects that were part of the synchro-cyclotron installation or date to that time. On the wall on the right path of the entrance you see large tools that were used to tighten the bolts of the magnet pieces. At the end of the path you see two control units that were driving two mobile shields. All around (on the walls and on the two tables on the left path) you see other objects of the time such as loudspeakers, telephones, an oscilloscope, a mechanical computer, and a typewriter.

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The Cryolab

The Central Cryogenic Laboratory (building 165). CERN uses 130 tonnes of superfluid helium to cool the LHC magnets and to keep the accelerator in the superconducting state. In the Cryolab you'll be able to witness how helium passes from the liquid to the superfluid state and how its behavior changes in the process. During the visit one can have a look at normal helium, in a glass cryostat, being brought to its superfluid state. Several experiments with superfluid helium will be performed.

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About the ATLAS Experiment chasing the Higgs particle and much more...

ATLAS is one of the four major experiments at the Large Hadron Collider (LHC) at CERN. It is a general-purpose particle physics experiment run by an international collaboration and, together with CMS, is designed to exploit the full discovery potential and the huge range of physics opportunities that the LHC provides.

ATLAS' scientific exploration uses precision measurement to push the frontiers of knowledge by seeking answers to fundamental questions such as: What are the basic building blocks of matter? What are the fundamental forces of nature? Could there be a greater underlying symmetry to our universe?

ATLAS physicists test the predictions of the Standard Model, which encapsulates our current understanding of what the building blocks of matter are and how they interact. These studies can lead to ground-breaking discoveries, such as that of the Higgs boson, physics beyond the Standard Model and the development of new theories to better describe our universe.

The years ahead will be exciting as ATLAS takes experimental physics into unexplored territories – maybe with new processes and particles that could change our understanding of energy and matter.

A description of the ATLAS Visitor Centre can be found at: https://atlas-public.web.cern.ch/resources/visit

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CCC: The CERN Control Center

The Cern Control Center, or CCC, is the centre of the pulsating heart of CERN. Particles generated and accelerated in the injector chain are timed with utter precision and sent to one of the many CERN experiments, or injected into the LHC. This is where the Large Hadron Collider is driven to its record energy and luminosity.