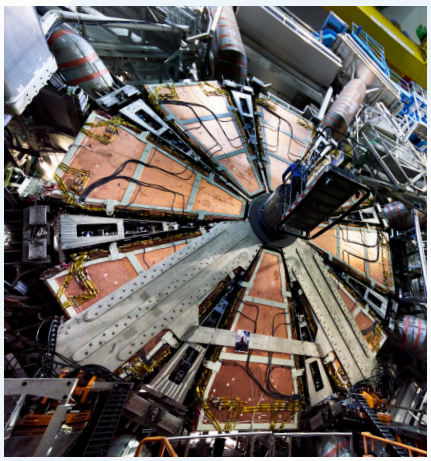


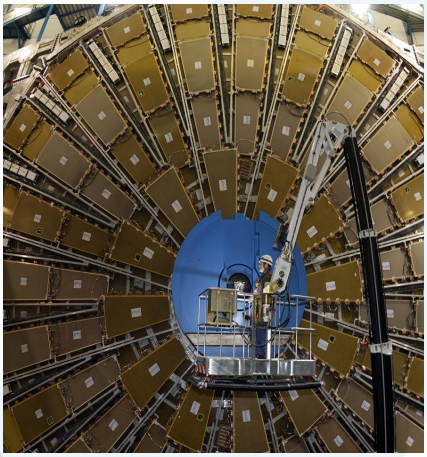
MUON SPECTROMETER

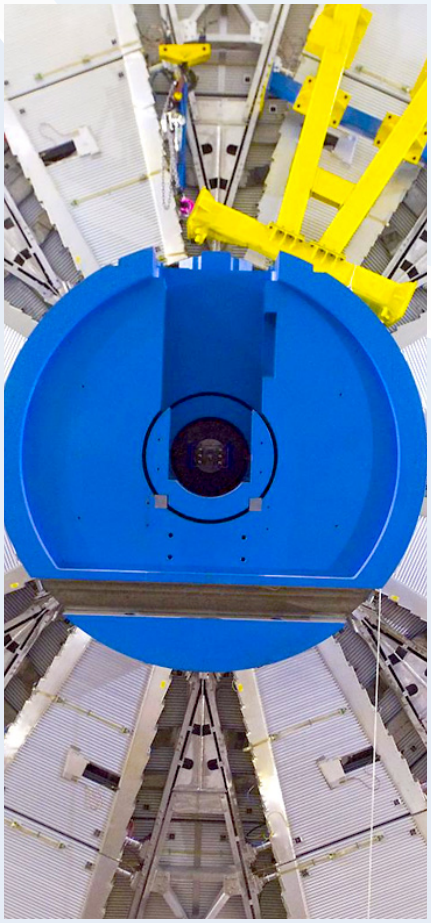
The outer layer of the ATLAS experiment is made of muon detectors. They identify and measure the momenta of muons – particles similar to electrons but 200 times heavier, which allows them to cross the thick calorimeter layers.

PRECISION DETECTORS

The precision detectors of the Muon Spectrometer are able to determine the position of a muon, to an **accuracy of less than a 10th of a millimeter!**

Monitored Drift Tube (MDTs) detectors are composed of 3 cm wide aluminum tubes filled with a gas mixture. Muons pass through the tubes, knocking electrons out of the gas. These then drift to a wire at the tube's centre to induce a signal. Over **380,000 aluminum tubes** are stacked up in several layers in order to precisely trace the trajectory of each muon.





FAST-RESPONSE DETECTORS

ATLAS uses fast-response detectors to quickly select collision events that are potentially interesting for physics analysis. They **make this decision within 2.5 µs** (400,000th of a second).

The Resistive Plate Chambers (RPCs) surround the central region of the ATLAS experiment. They consist of pairs of parallel plastic plates at an electric potential difference, separated by a gas volume. Thin Gap Chambers (TGCs) are found at the ends of the ATLAS experiment and consist of parallel **30 µm wires** in a gas mixture. Both chambers detect muons when they ionise the gas mixture and generate a signal.

Micromegas and Small-Strip Thin-Gap Chambers (sTGCs) are two additional detector technologies specially designed for **high-intensity LHC collisions**. These detectors can track muons in high-density areas on either side of the experiment close to the LHC beam pipe, both quickly and with high precision.

The combined data from fast-response detectors gives a coarse measurement of a muon's momentum, allowing ATLAS to choose whether to keep or discard a collision event.