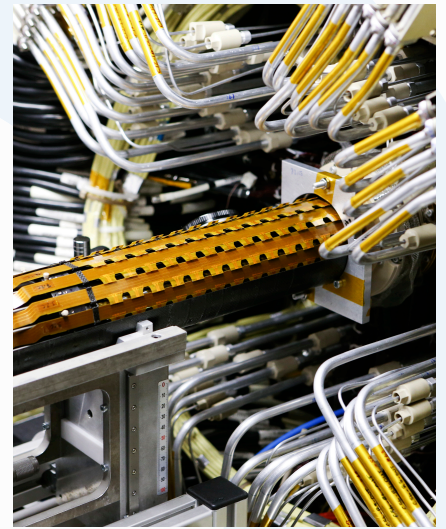
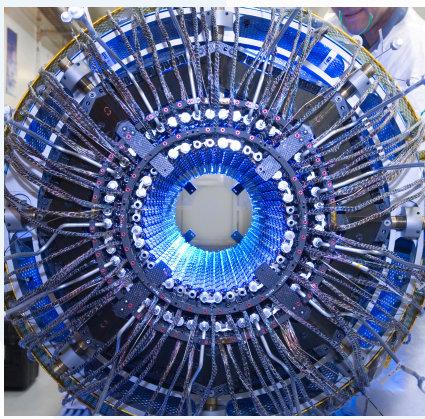


THE INNER DETECTOR

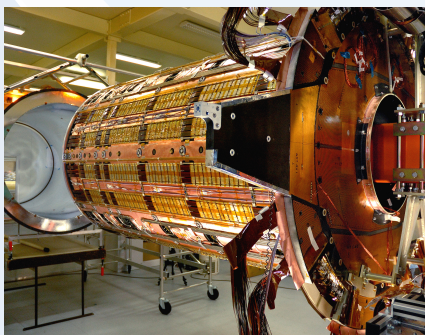


The Inner Detector is the innermost part of ATLAS to see the decay products of the collisions, so it is very compact and highly sensitive. It consists of three different systems, measuring the direction, momentum and charge of electrically-charged particles produced in collisions.



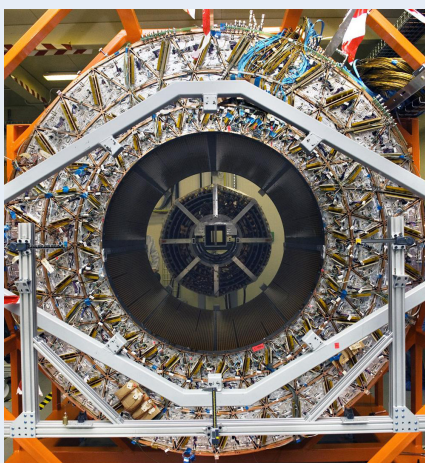
PIXEL DETECTOR

Located just 3.3 cm from the LHC beam line, the Pixel Detector is the first point of detection in the ATLAS experiment. It is made up of four layers of silicon pixels, with **each pixel smaller than a grain of sand**. As charged particles burst out from the collision point, they leave behind small energy deposits in the Pixel Detector. These signals are measured with a precision of almost 10 μm to determine the origin and momentum of the particle. The Pixel Detector is incredibly compact, with over **92 million pixels and almost 2000 detector elements**.



SEMICONDUCTOR TRACKER

The Semiconductor Tracker surrounds the Pixel Detector and is used to detect and reconstruct the tracks of charged particles produced during collisions. It consists of over 4,000 modules of **6 million "micro-strips" of silicon sensors**. Its layout is optimised such that each particle crosses at least four layers of silicon. This allows scientists to **measure particle tracks with a precision of up to 25 μm** - that's less than half the width of a human hair!



TRANSITION RADIATION TRACKER

The third and final layer of the Inner Detector is the Transition Radiation Tracker (TRT). Unlike its neighbouring sub-detectors, the TRT is made up of **300,000 thin-walled drift tubes** (or "straws"). Each straw is just 4 mm in diameter, with a 30 μm gold-plated tungsten wire in its centre. The straws are filled with a gas mixture. As charged particles cross through the straws, they ionise the gas to create a detectable electric signal. This is used to reconstruct their tracks and, owing to the so-called transition radiation, **provides information on the particle type** that flew through the detector, i.e. if it is an electron or pion.