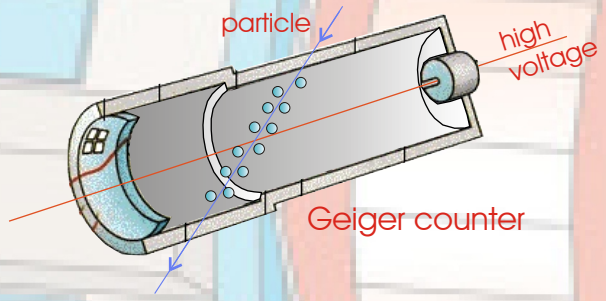
Royal Holloway University of London

Particle Detectors

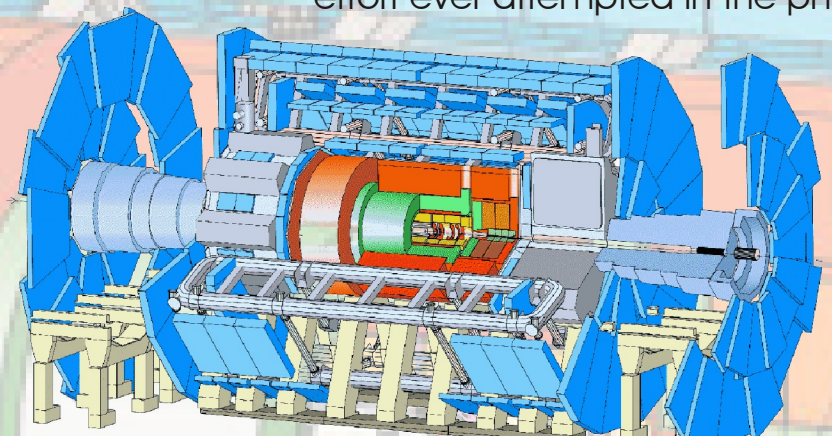
Particle detection can be based on several effects such as ionisation, Cerenkov radiation and electron-hole pair production in semiconductors.

A charged particle passing through a Geiger counter causes ionisation. The ionisation electrons drift towards the wire creating further ionisation, producing a large signal.



The ATLAS detector

The ATLAS experiment is under construction by 1700 collaborators in 150 institutes around the world. It is the largest collaborative effort ever attempted in the physical sciences. It will study proton-proton interactions at the Large Hadron Collider (LHC) at CERN. The primary purpose of the detector is to search for the Higgs boson and hence increase our understanding of mass. It is also able to study the properties of the top quark.



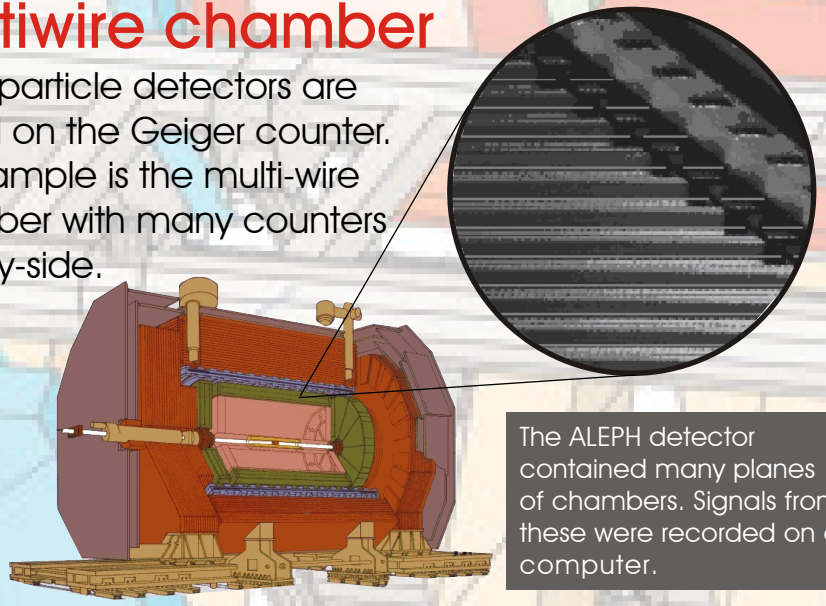
The ATLAS detector

The ATLAS detector is 22 m high and 44 m long.

Further information:
atlasinfo.cern.ch/Atlas/public

Multiwire chamber

Many particle detectors are based on the Geiger counter. An example is the multi-wire chamber with many counters side-by-side.

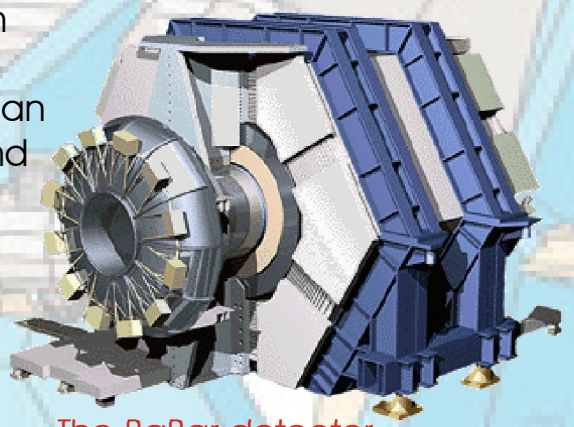


The ALEPH detector contained many planes of chambers. Signals from these were recorded on a computer.

The BaBar detector

The BaBar detector is exploring the small difference in the behaviour of matter and antimatter that may be responsible for our existence. It can record subtle distinctions in the way B mesons and anti-B mesons decay. Both are more than five times the mass of protons and survive just over a trillionth of a second. It is operating at the Stanford Linear Accelerator Center in California.

Further information:
www2.slac.stanford.edu/VVC



The BaBar detector

Background: Image of the ATLAS detector