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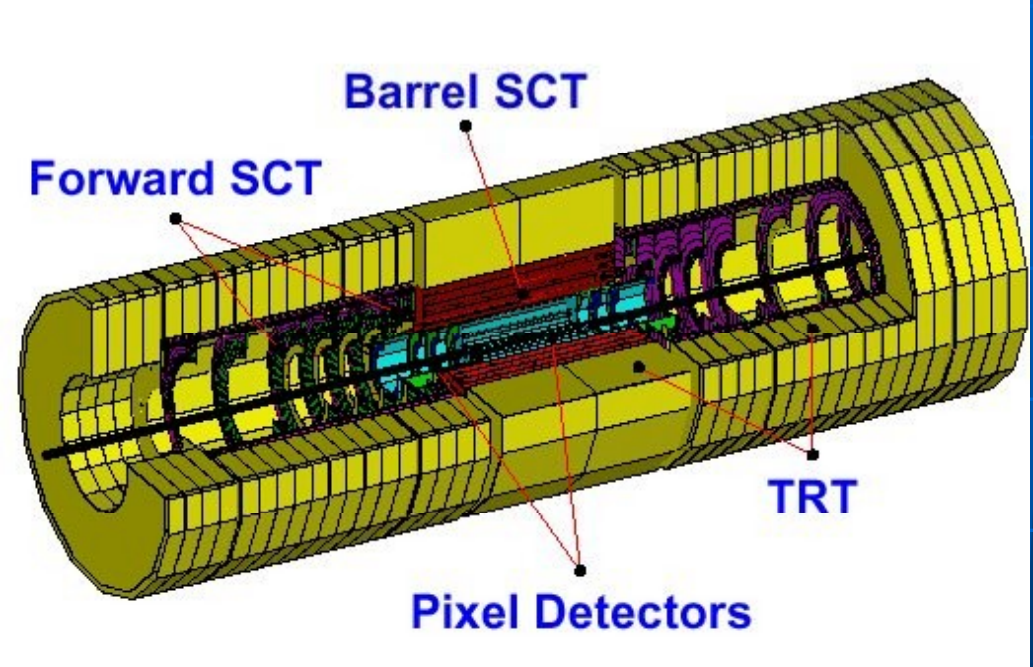
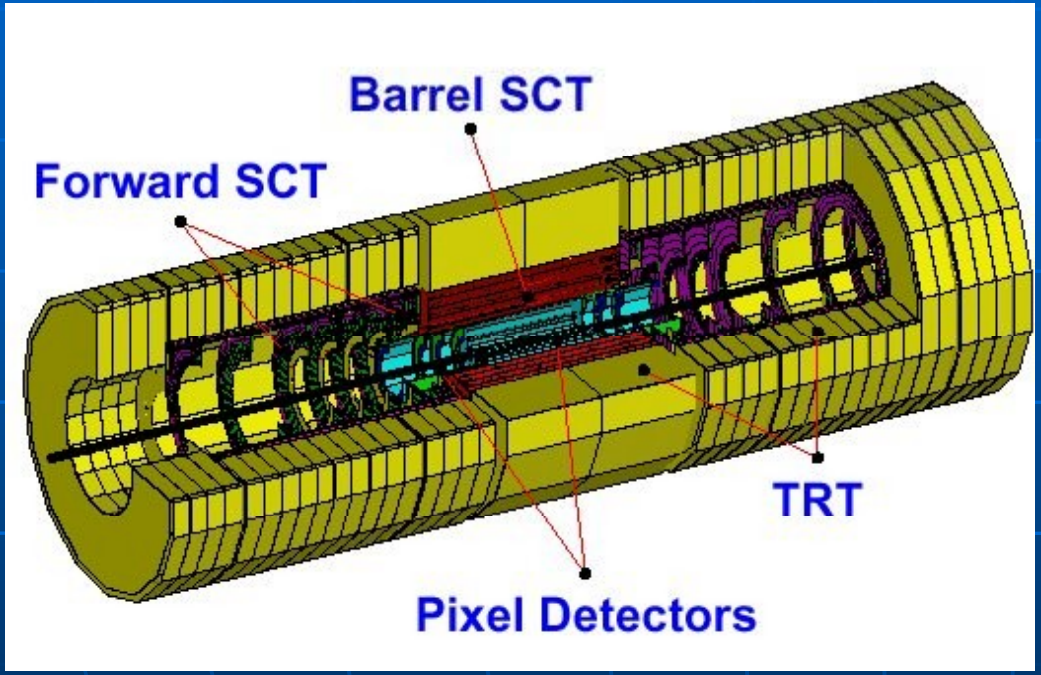
The ATLAS SemiConductor Tracker

SCT construction



- One of three tracking detectors making up the ATLAS inner detector.
- Four barrel cylinders and 9x2 end-cap disks.
- 4088 detector modules.
- 2112 barrel modules with same design.
- 1976 end-cap modules have four different designs.
- around 6.3 million readout channels.
- 15392 silicon wafers.



- 20-50 cm from interaction point
- 5.6 m long
- Cover pseudo rapidity greater than 2.5

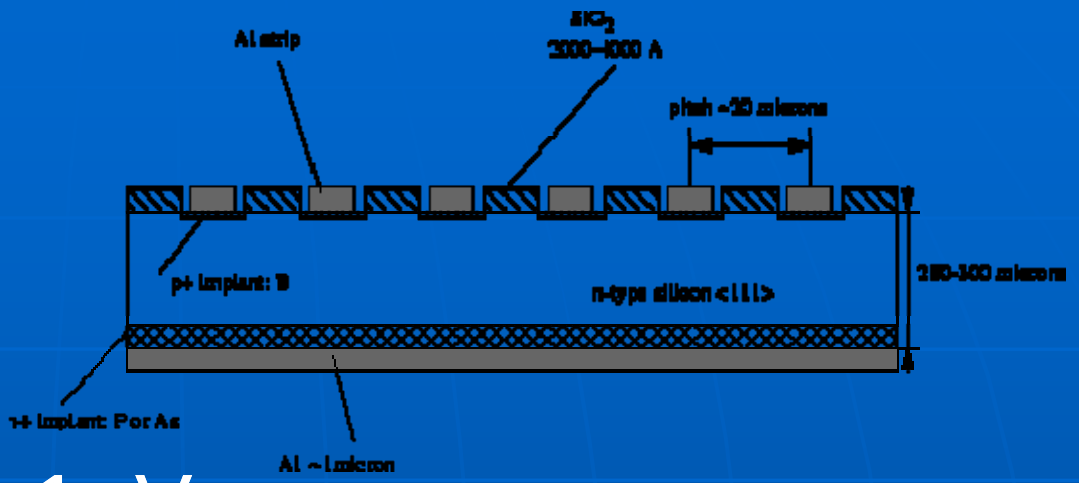
SCT vs older detector types

- Higher resolution (~5micro meter?)
- More expensive
- Need cooling to reduce leakage currents , -7degree Celcius
- Suffer degradation over time from radiation

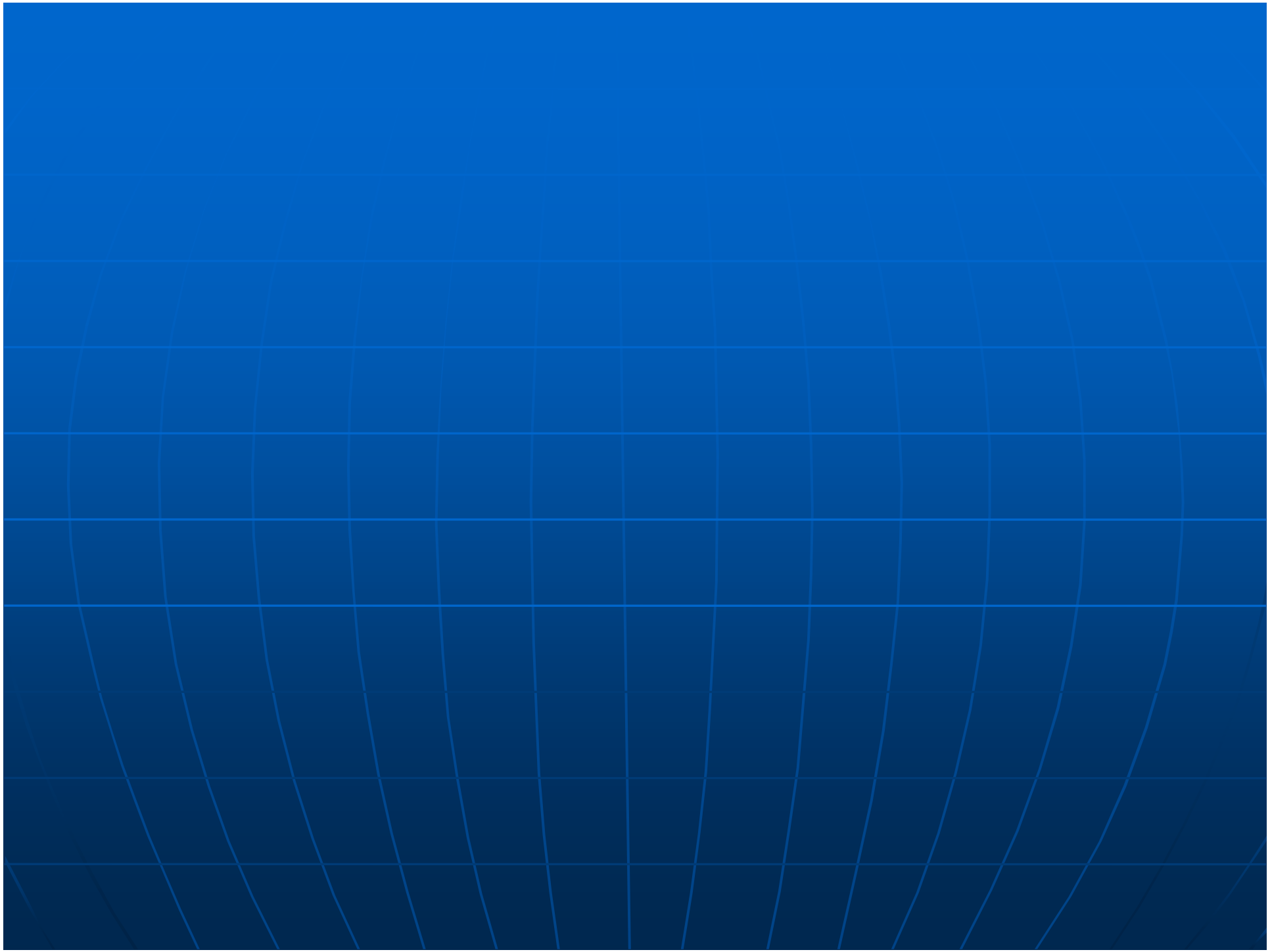
What?

- Register particle track
- Magnet system curve particle trajectory (2Tesla) (F=qv x B)
- Determine
  1. Vertex
  2. Momentum
  3. Sign of charge

How?



- Si band gap 1.1eV
- 3.6eV to create electron-hole pair
- p-n junction diodes at reverse bias
- Potential barrier
- External electric field
- Read out by front-end electronics



CERN

- Big organization
- Paperwork
- Lectures
- Meetings
- Cable test
- Programming project
- Social life