



## L H C

### LHC Superconducting Magnets:

KEK developed and completed 19 superconducting quad magnets MQXA. These 6.5m-long magnets with the field gradient of 215 Tesla/m will be used to focus the LHC beams at the high-luminosity interaction points. The construction started in Jun. 2001 and ended in Jan. 2004. The measurements at KEK showed their excellent field qualities. All magnets were shipped to Fermilab for assembly and then transported to CERN for final installation in the LHC tunnel.



Conductor winding at Toshiba

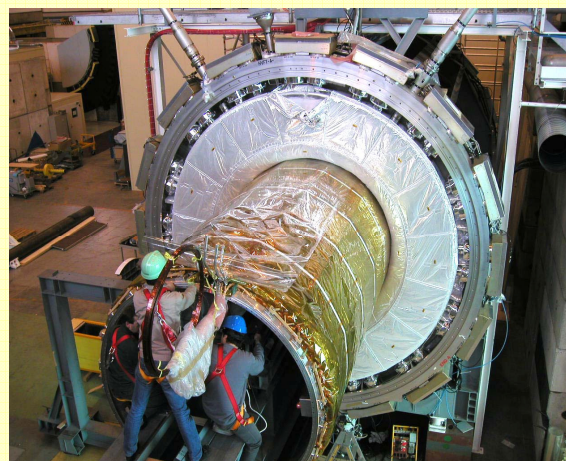


Installation in progress in LHC tunnel

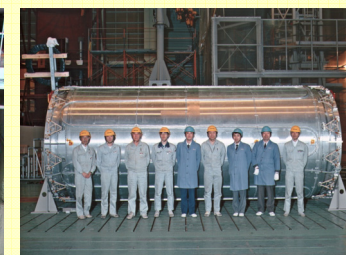
## A T L A S

### Superconducting Solenoid:

KEK designed and constructed a superconducting solenoid which provides a 2 Tesla field for ATLAS Inner Detector region. The coil is specially designed to minimize its thickness while keeping enough safety. After completed at Toshiba, it was shipped to CERN in 2001. After integrated with LAr calorimeter and test, the coil was installed in ATLAS detector. The test at final position was successful on 1 Aug. 2006.



Coil insertion to LAr cryostat at CERN (2004.2.27)



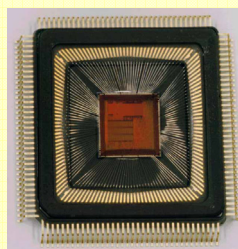
Coil completed at Toshiba (1999.12.7)



Celebrating successful test at final position in ATLAS pit (2006.8.1)

### Muon Detectors:

KEK and Japanese universities (Tokyo, Kobe, TMU, Nagoya...) are in charge of construction of the muon system. For end-cap muon triggering, 1,100 TGCs (thin gap wire chamber) were manufactured at KEK, being tested at Kobe using cosmic-rays. TGC readout and Level-1 trigger electronics were designed and constructed by KEK, Kobe etc. All chambers and electronics are being assembled into big-wheel at CERN. TDC ASIC chips AMT3 was designed by KEK for MDT readout.



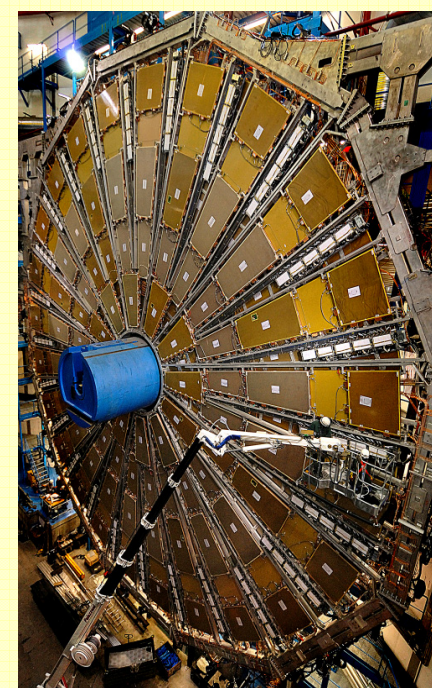
24ch TDC ASIC chips AMT3 was designed by KEK for MDT readout.



TGC construction at KEK



AMT3 TGC sector assembly at CERN



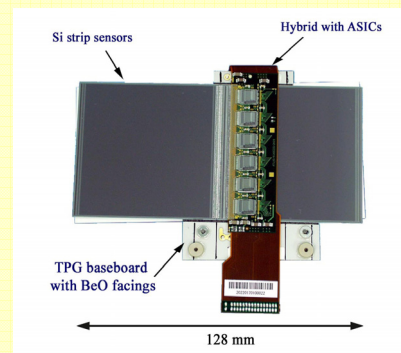
TGC big-wheels are being assembled in the ATLAS pit.

### Silicon SCT Tracker:

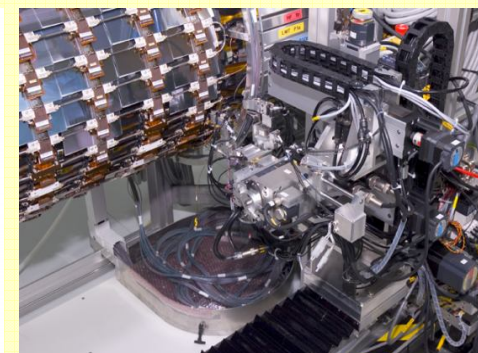
KEK designed and fabricated Cu/Polyimide hybrid circuits with efficient thermal removal capability. A high precision assembly technique was developed for positioning sensors within a few microns. KEK completed production and inspection of 980 barrel SCT modules (40% of all).



Sensor bonding and inspection at KEK



980 modules assembled and inspected by KEK



Module assembly at Oxford using KEK robot.