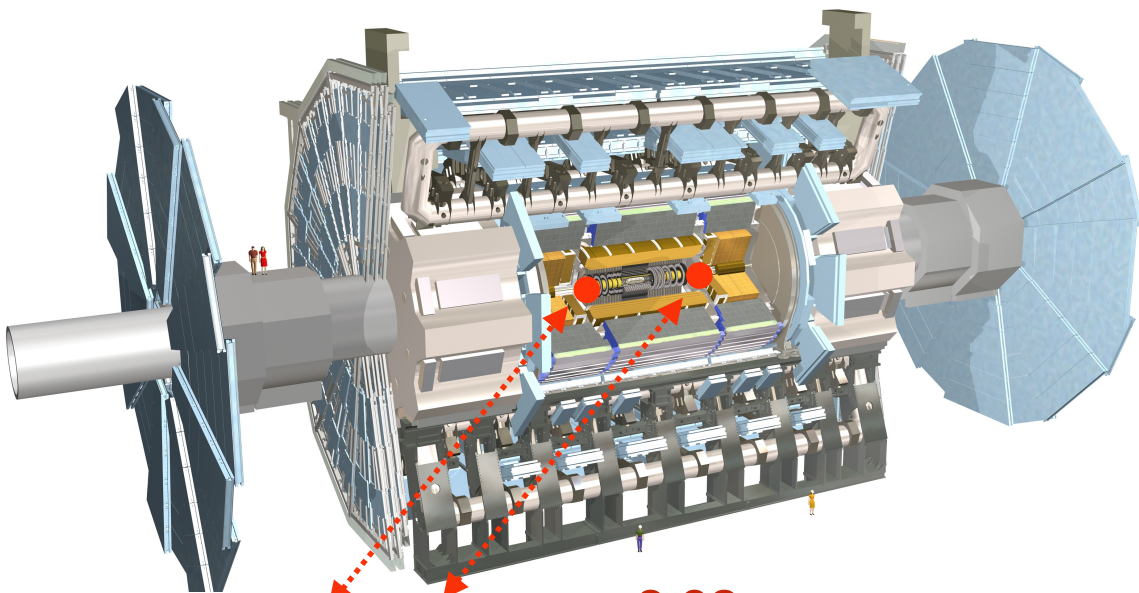


# Minimum Bias Trigger Scintillators for ATLAS

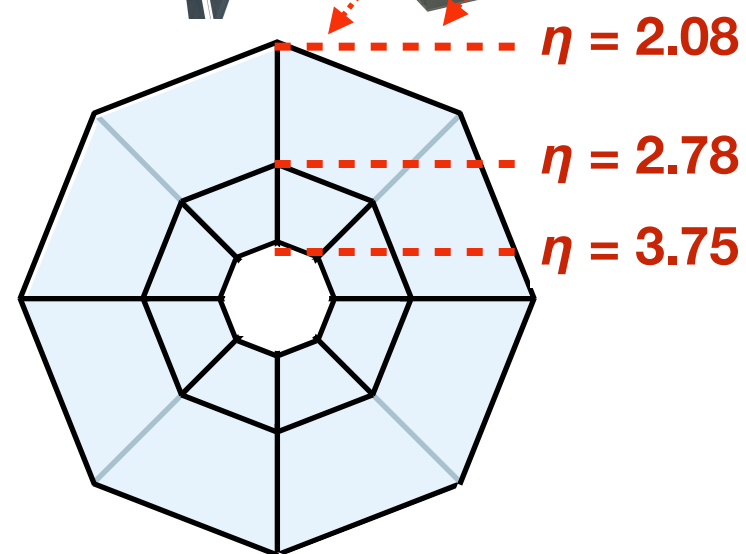
## Commissioning and Run 2 Initial Operation



The Minimum Bias Trigger Scintillators (MBTS) were successfully deployed and operated in ATLAS during the running period of 2010 - 2013 (LHC Run-1).

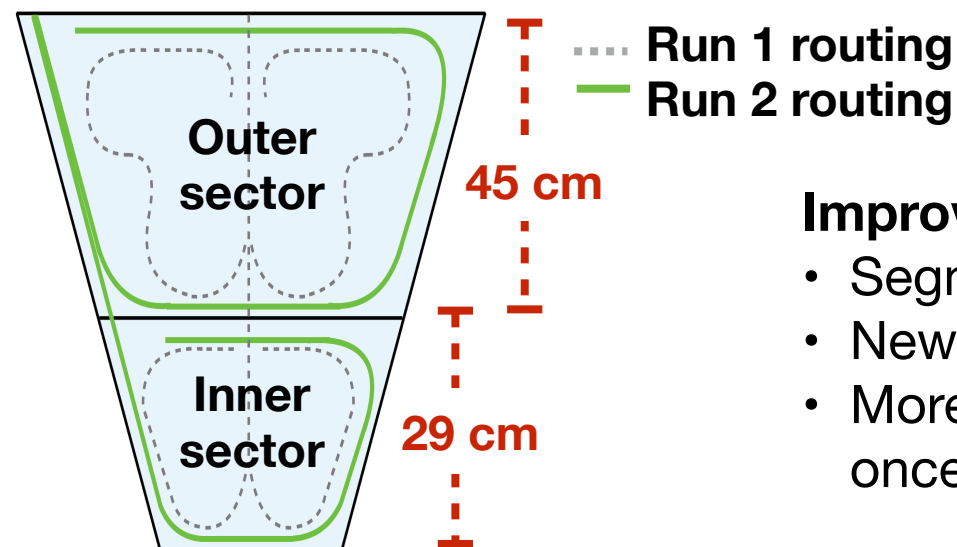
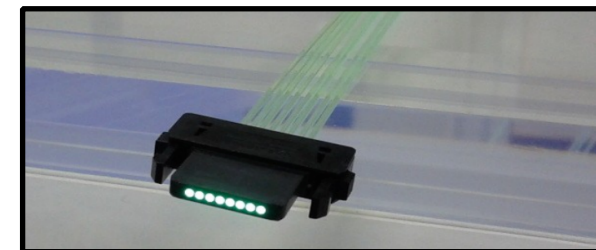
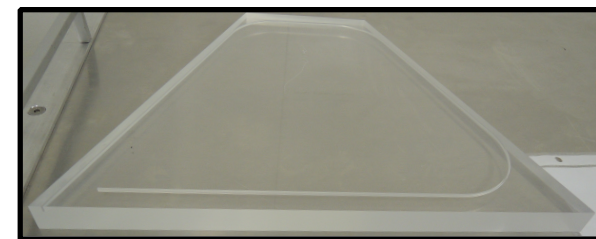
- Provided highly efficient triggering on minimum-bias proton-proton and heavy-ion collisions.

The radiation dose from Run-1 ( $\sim 10^4$  Gy) degraded the transparency of the scintillating medium heavily ( $\sim 50\%$ ). Therefore, the MBTS underwent a complete replacement in preparation for LHC Run-2 (2015-2017).



The ATLAS MBTS are scintillation detectors

- Each counter composed of 2 cm thick polystyrene
- Light collected with wavelength shifting fibers (WLS) embedded into grooves
- Light transported to PMTs with clear optical fibers



Improvements implemented in MBTS layout for Run-2

- Segmentation of both sectors reduced from two to one piece
- New WLS routing scheme maximises and homogenises light yield
- More flexible readout scheme allows for recuperating light yield once detector transparency has degraded

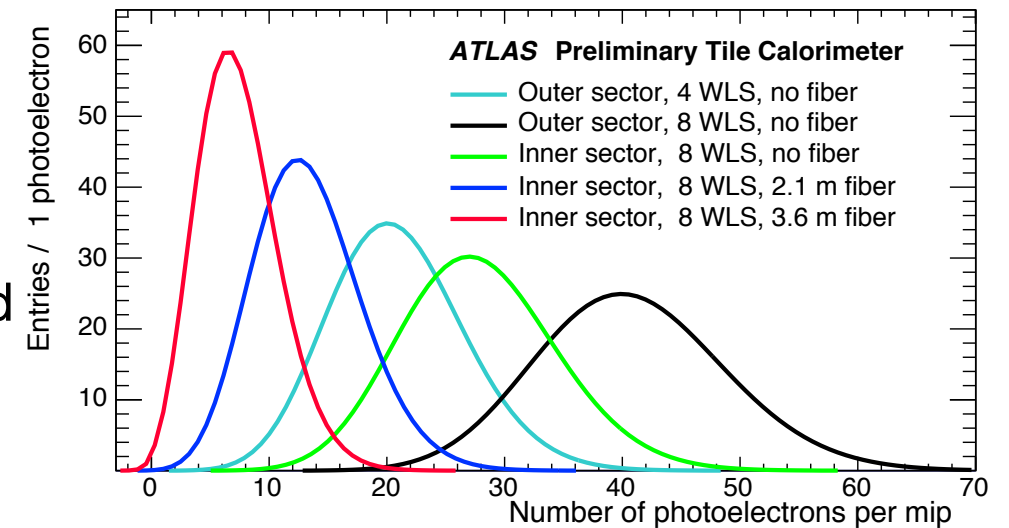
# Minimum Bias Trigger Scintillators for ATLAS

## Commissioning and Run 2 Initial Operation

**A Run-2 MBTS counter was characterised with cosmic radiation in a laboratory setup**

- Light yield from inner and outer sector determined
- Light yield when using 4 or 8 WLS tested
- Attenuation of clear fibers intended for installation determined

**Measured light yield in agreement with expectations from detector design**



**The Run-2 MBTS counters were integrated into the DAQ system in Summer 2014**

**The timing of the MBTS trigger signals was determined with first LHC Run-2 beam splashes (events induced by dumping beam on collimator)**

- Timing w.r.t. independent, single-sided ATLAS calorimeter trigger on outgoing splash particles

**Operations under beam-splash events indicate that the MBTS are well-timed in and ready for LHC Run-2**

