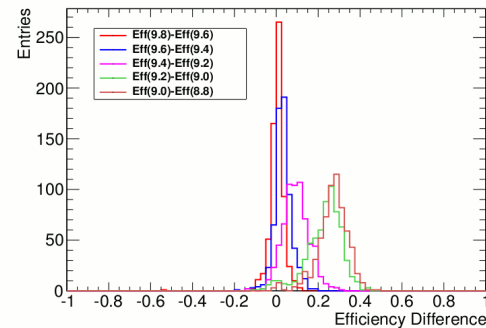


Large - scale performance studies of the Resistive Plate Chamber fast tracker for the ATLAS 1st - level muon trigger

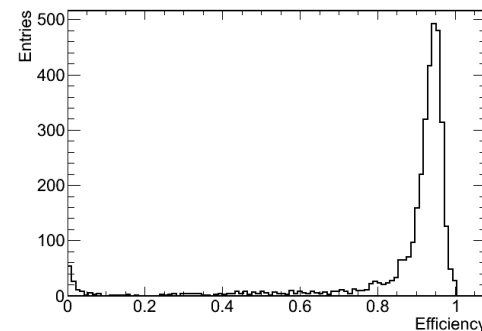
Results with Cosmics

ATLAS data is divided into different **streams**. In order to achieve a detailed and reliable measurement of the detector response up to the level of the individual strips, a dedicated stream has been foreseen, called **muon calibration stream**.

It contains the output of the Level 2 muon trigger, hence it comes at a much higher rate than the events selected by the full trigger chain. Each event contains *only hits from the muon spectrometer*, in a region where a muon trigger occurred, i.e. a two-muons event would be split in two calibration stream events. The main advantage of the calibration stream is its high statistics.

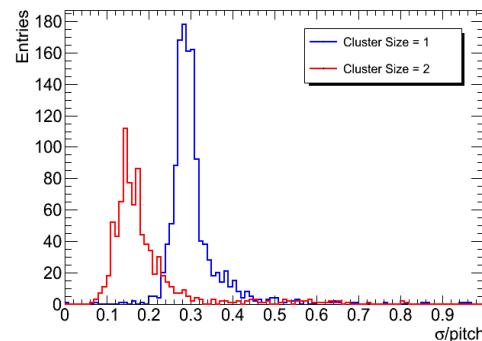


Efficiency increase when increasing the operating High voltage value. Average efficiency values per panel are shown, for all panels under test. The typical plateau behavior is clearly visible, with fermi-like raise around 9.0kV, and the plateau starting from around 9.4kV.



Panel efficiency for BM chambers at working point (HV 9.6 kV, $V_{th} = 1.0$ V).

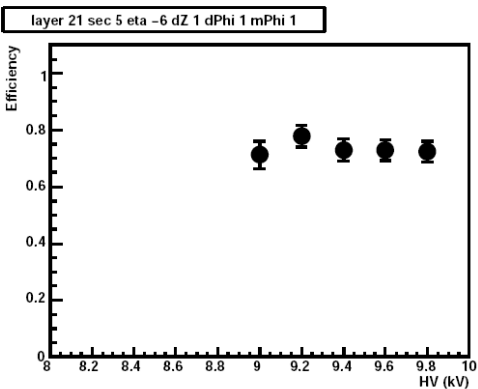
- 2547 panels have efficiency above 90%
- 583 panels have efficiency between 70 % and 90%
- 478 panels have efficiency under 70%



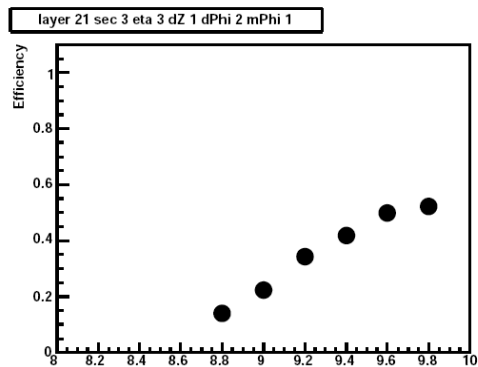
Spatial resolution for BM chambers obtained from a gaussian fit of the residual distribution normalized to strip pitch, in the case of clusters of size 1 (blue line) and size 2 (red line). As expected cluster of size 2 show a better resolution due to the small region in which the particle crosses the detector.

Panel Classification

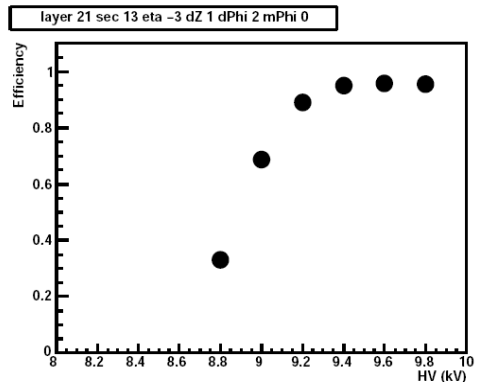
- Given the large number (~8000) of RPC readout panels some automatic procedure is needed to spot potential problems
- For example one can look at the efficiency vs. HV relation



Panels not varying their performance when changing HV, mostly due to DCS mapping errors.
1.9% of total tested panels falls in this category



Panels with the rising shifted towards higher HV values. This effect is under investigation.
2.3% of the total tested panels falls in this category



Panels behaving as expected. Most of the total tested panels falls in this category

Correlation with Production DB

The idea is to correlate the performances and status of RPCs as installed in the ATLAS cavern with the information recorded during the different production phases. Several informations were stored during production at different sites (Lecce, Naples, Roma2). Needs the merging of databases with different technologies

