

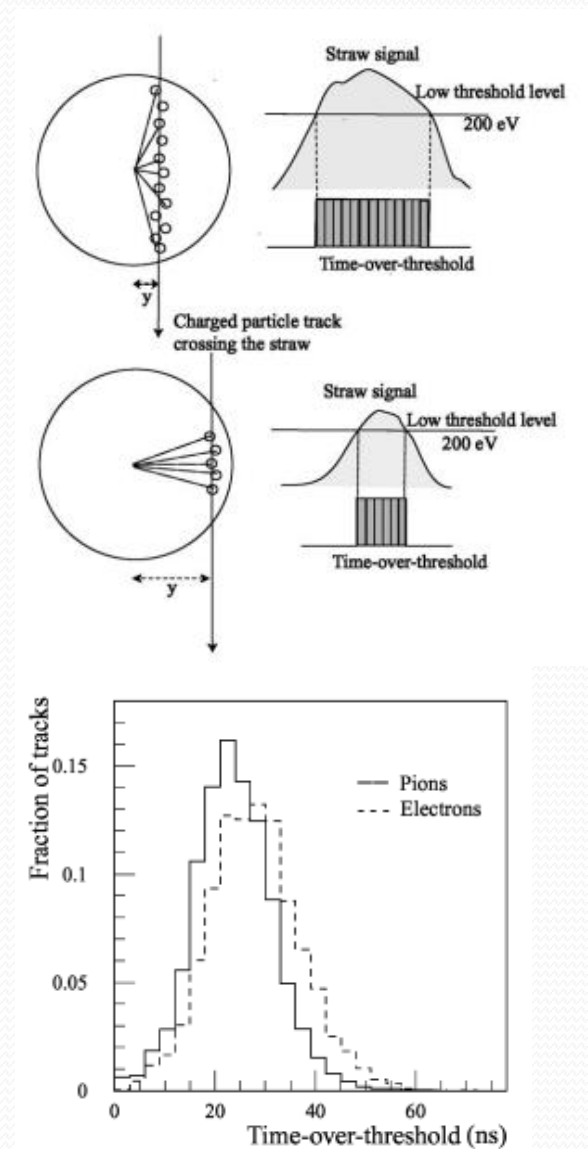
# Overview on ATLAS TRT Particle Identification using ToT

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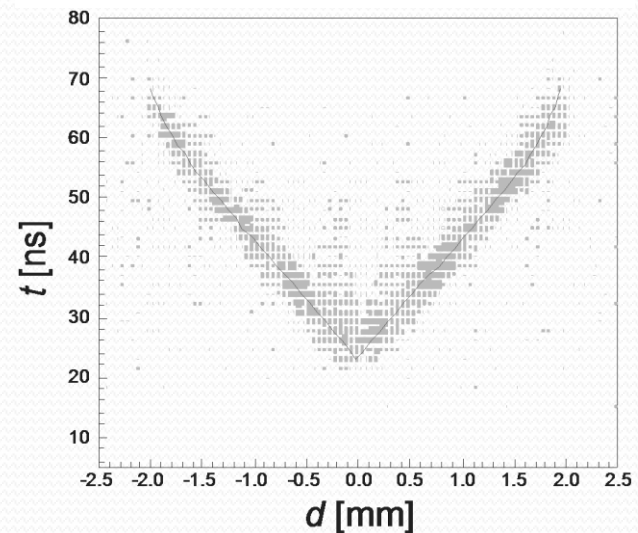
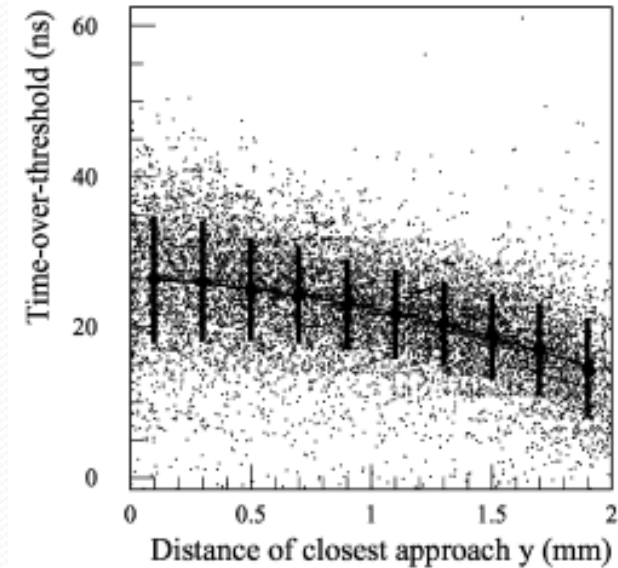
# Time over threshold TRT straw

- Time over threshold dependence of track distance from wire
- Have to be corrected to extract  $dE/dx$
- Uncorrected time over threshold gives
  - 3.125 ns binning time



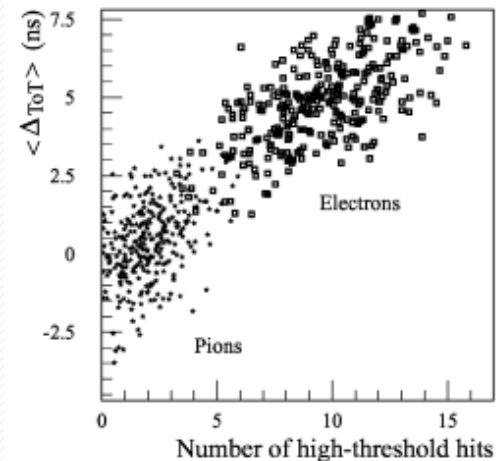
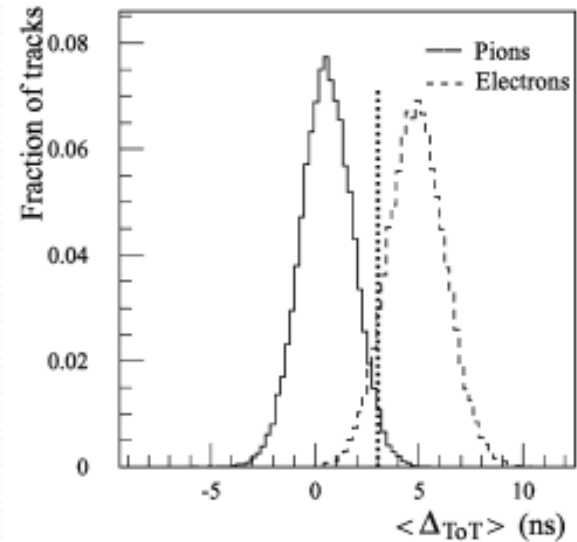
# ToT correction – single straw

- Parameterization done for 5 GeV pions
  - Straw divided into 200  $\mu\text{m}$  bins
  - Polynomial fit
  - $\Delta_{\text{ToT}} = \text{ToT}_{\text{meas.}}(y) - \text{ToT}_{\text{fit}}(y)$
  - This residual does not depend on the distance from wire
- Distance extracted from  $R(t)$  dependence



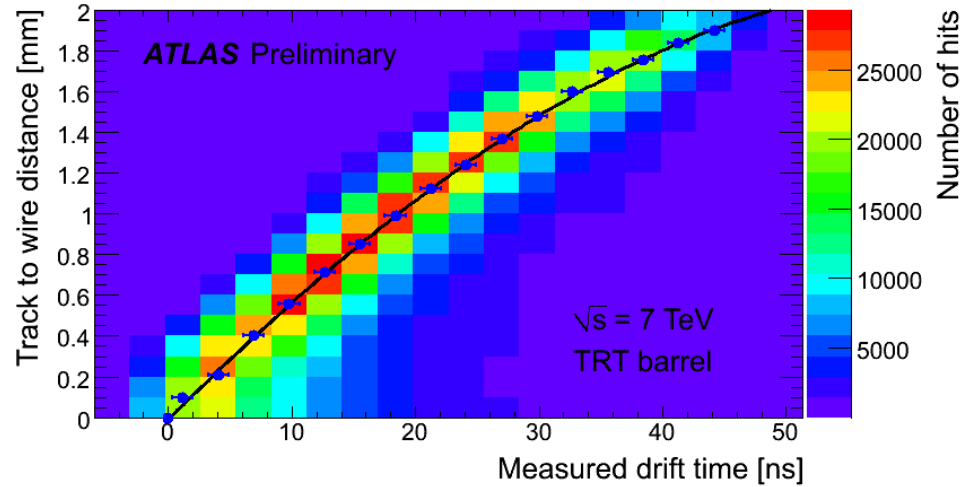
# ToT with tracks and HT hits

- Single straw still gives practically no particle identification
- Using all straws from track
  - Averaged  $\Delta_{\text{ToT}}$ 
    - $\langle \Delta_{\text{ToT}} \rangle = \sum_i \Delta_{\text{ToT}}^i / n$
- High level hits ( $> 5\text{keV}$ ) with averaged ToT gives good electrons/pions separation
- T. Akeson, et al., Particle identification using the time-over-threshold method in the ATLAS Transition Radiation Tracker, NIM A 474, 172-187

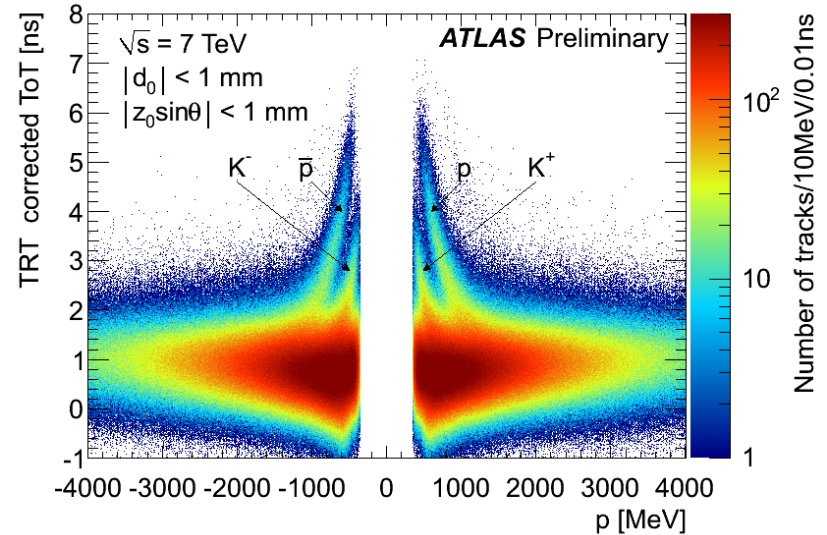


# Results with 7TeV beam

- R(t) relation for TRT barre]



- Particle identification



# Results with 7TeV beam

- High threshold hits probability vs gamma factor
- Electron/pion separation based on averaged corrected ToT

