

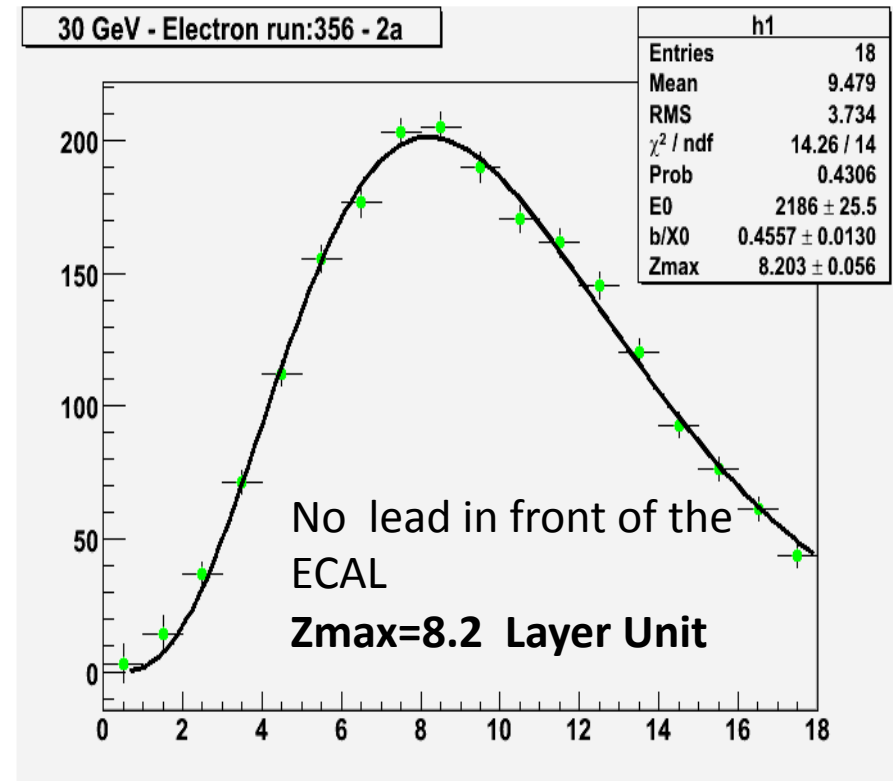
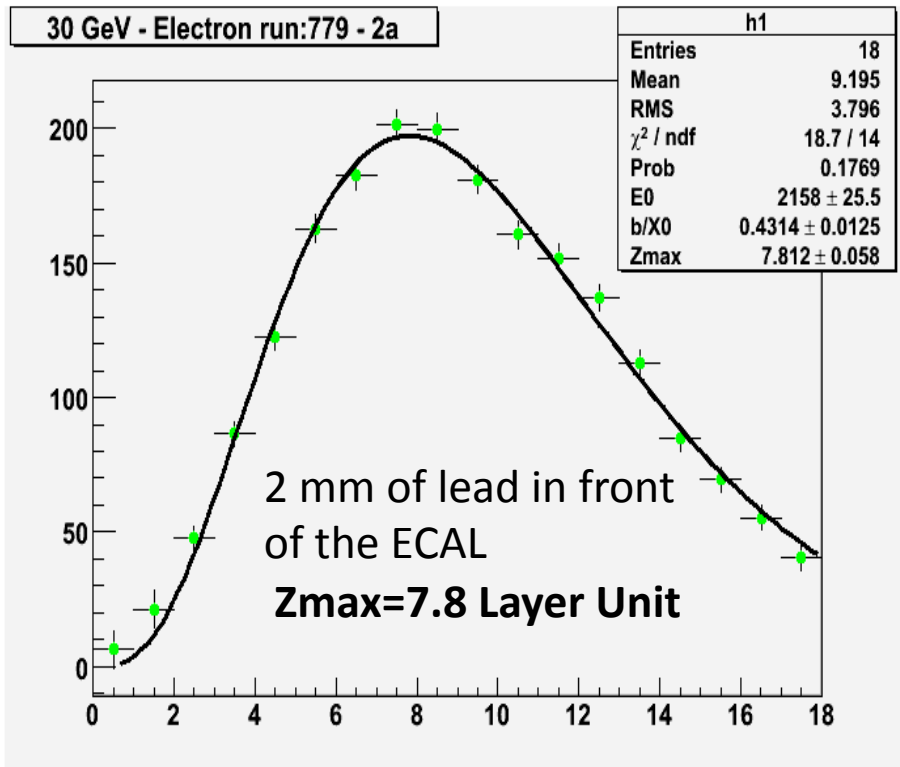
Matter in front of the ECAL ?

- From longitudinal profiles (TB 20010 versus TB2007)
- From Rich hit multiplicity
- From Tof hit multiplicity
- From lateral distribution

Principle

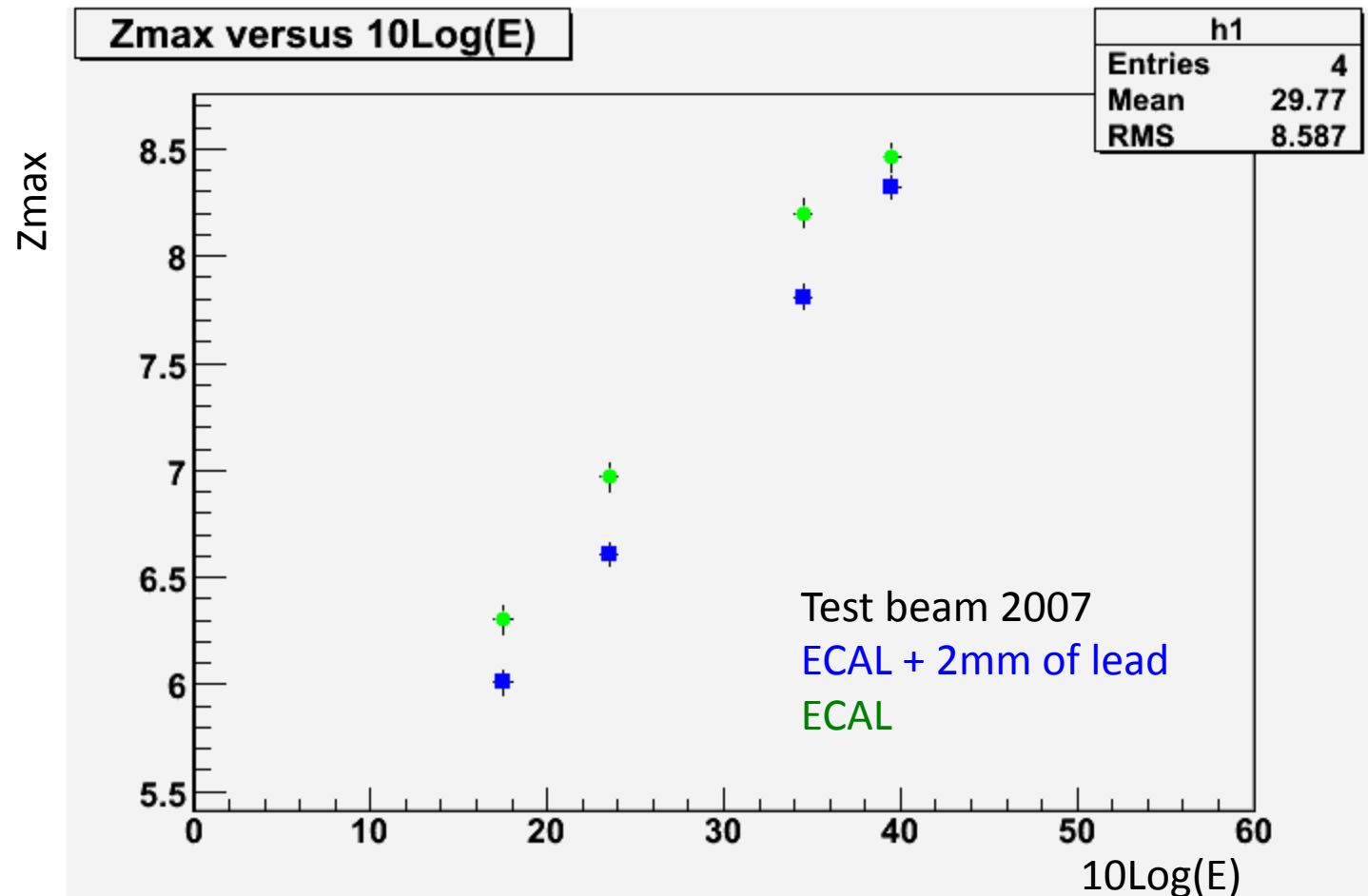
- Measurement of the position of the maximum of the longitudinal profile (matter in front-> shift, the shower will start earlier)

Test beam 2007



Method

- $\Delta X_0 = Z_{\text{max}}(\text{effective}) - Z_{\text{max}}(\text{ref, TB 2007})$



Selection – First step

- Data sample

- ISS B538 (all data processed but a fraction will be shown (ie last 2 months))
- Test Beam B538, ele180

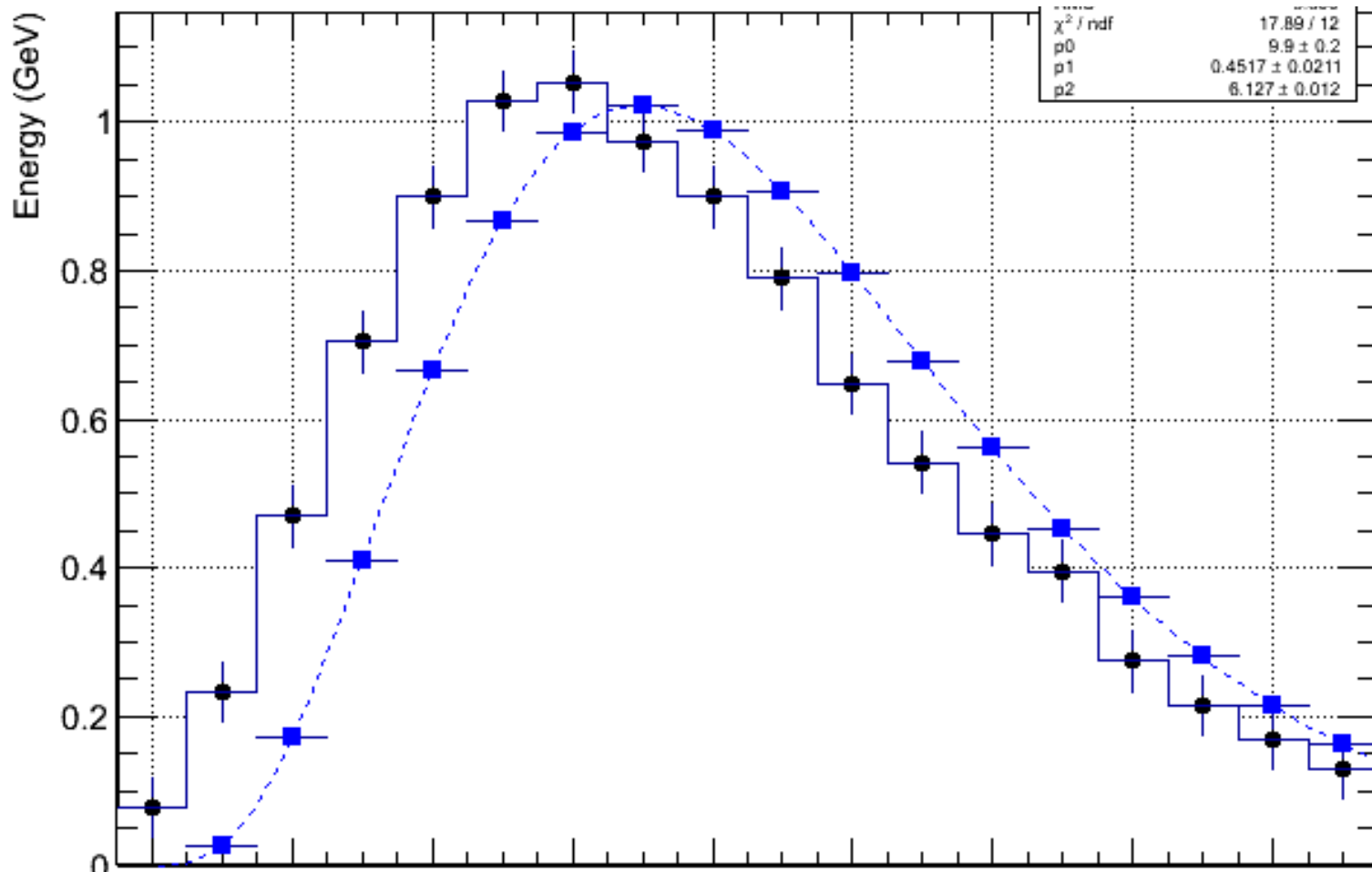
- Electrons

- Vertical particles ($\text{span}_x < 1$ and $\text{span}_y < 1$)
- Rely on TRD : TRD Likelihood [0.1-0.5]
- based on Vitaly's selection for EM (elec)
 - 1 EM shower, 1 track, 1 TRD track
 - Tracker “Good” track
 - Negative charge , $P_{\text{mom}} < -1 \text{ GeV}/c$
 - Spatial Matching between the track and the shower and the track and the TRD track
 - Ecal selection based on lateral variables (S_3/S_5 x,y, Lateral dispersion, etc)

Profile at 10 GeV (ISS)

ISS B538 (4 last months)

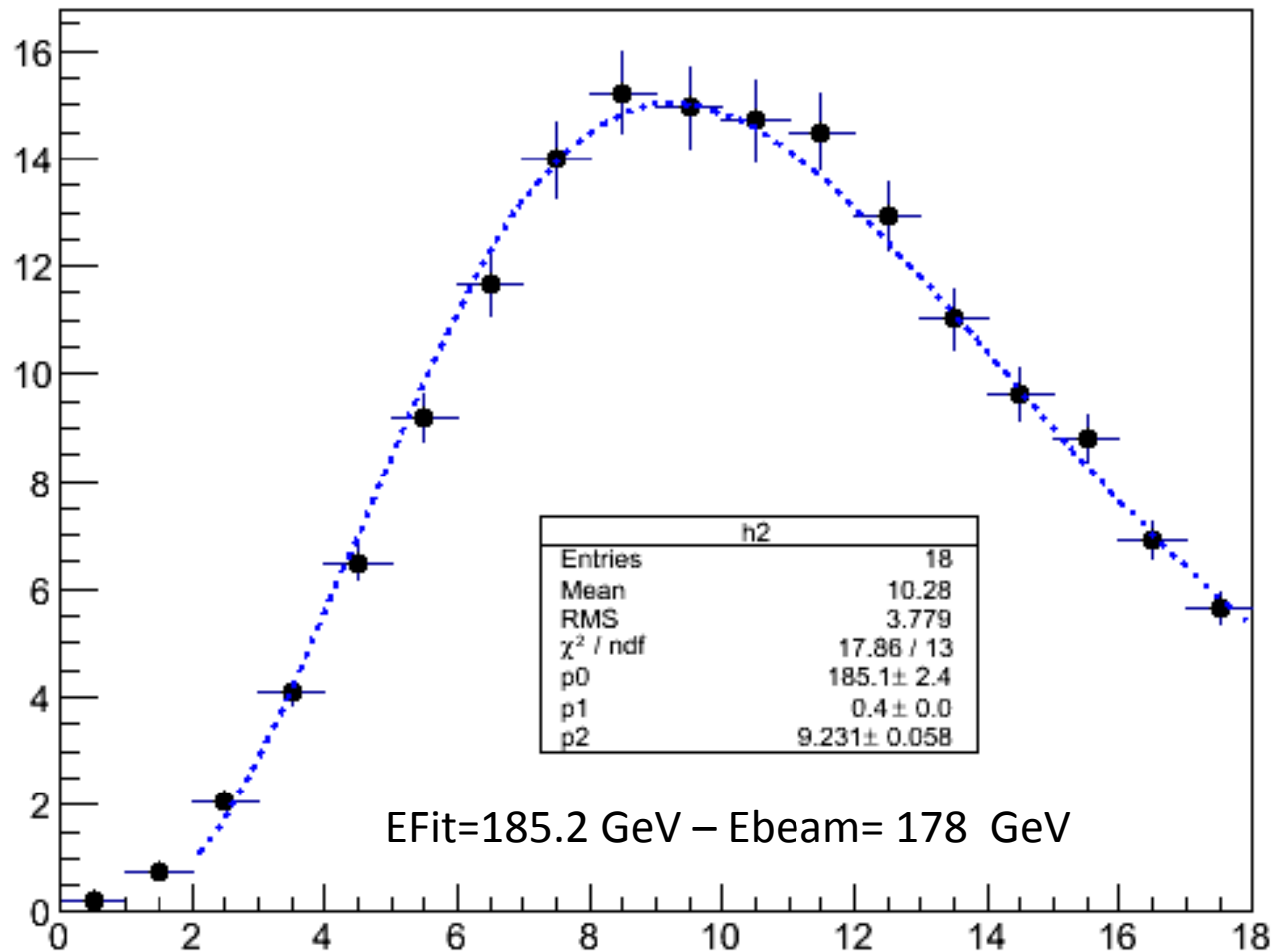
TB 2007 Data



Profile at 180 GeV (TB2007 versus TB2010)

TB 2010 $Z_{\text{max}} = 9.23 \pm 0.06$ (stat)

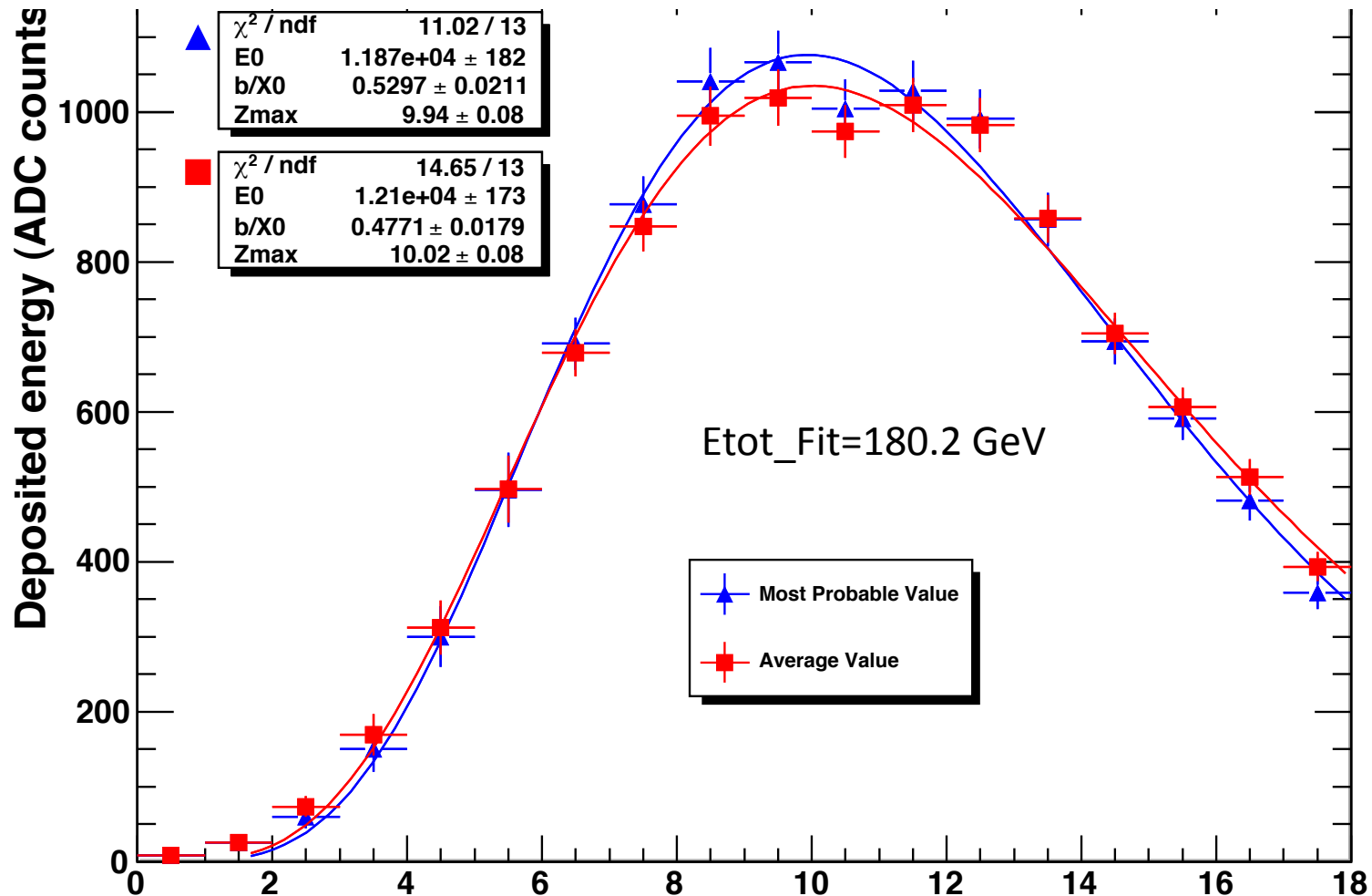
TB 2007 $Z_{\text{max}} = 10.0 \pm 0.08$ (stat)



Profile at 180 GeV (TB2007 versus TB2007 – 2 methods)

TB 2010 $Z_{\text{max}} = 9.23 \pm 0.06$ (stat)

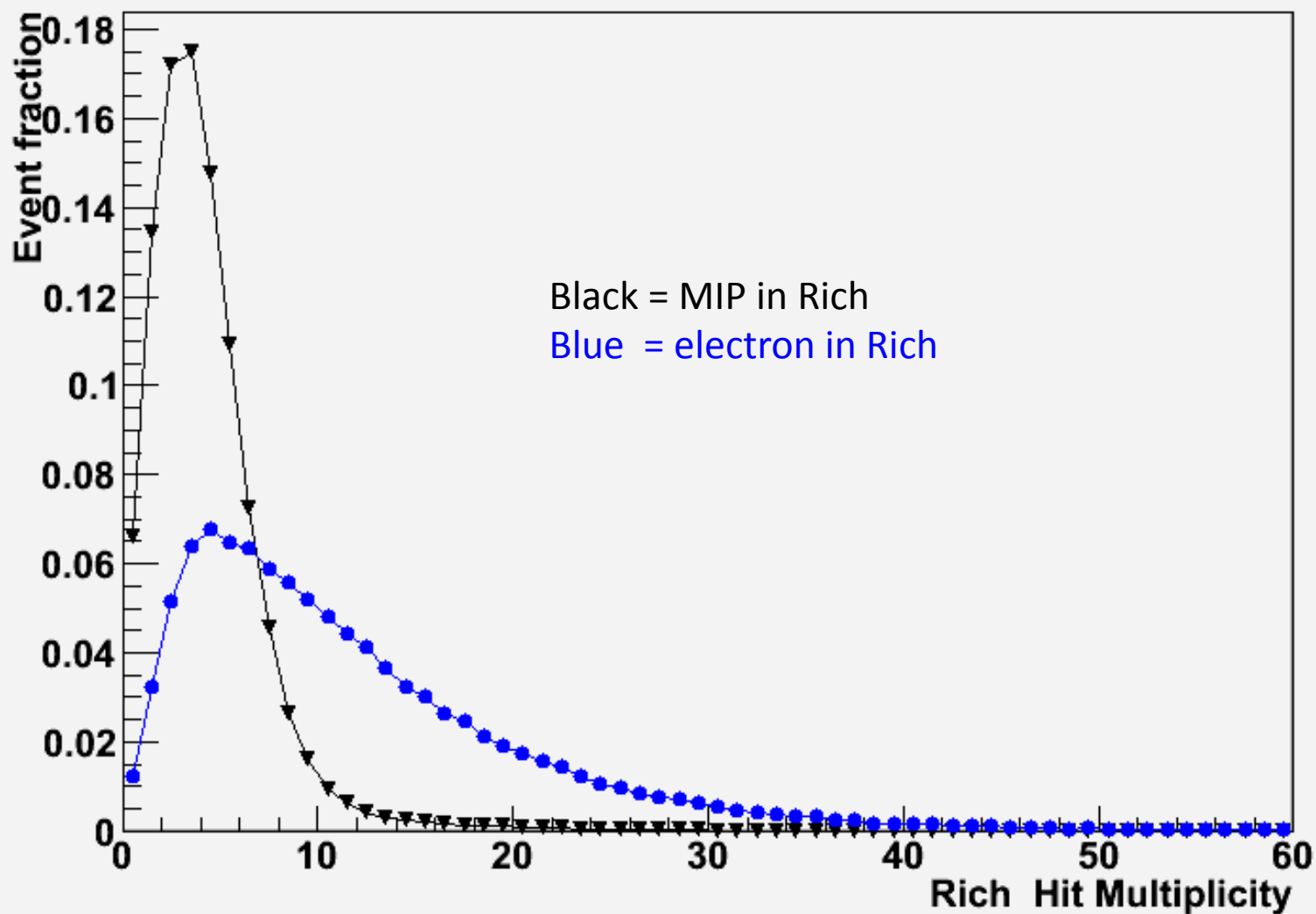
TB 2007 $Z_{\text{max}} = 10.0 \pm 0.08$ (stat)



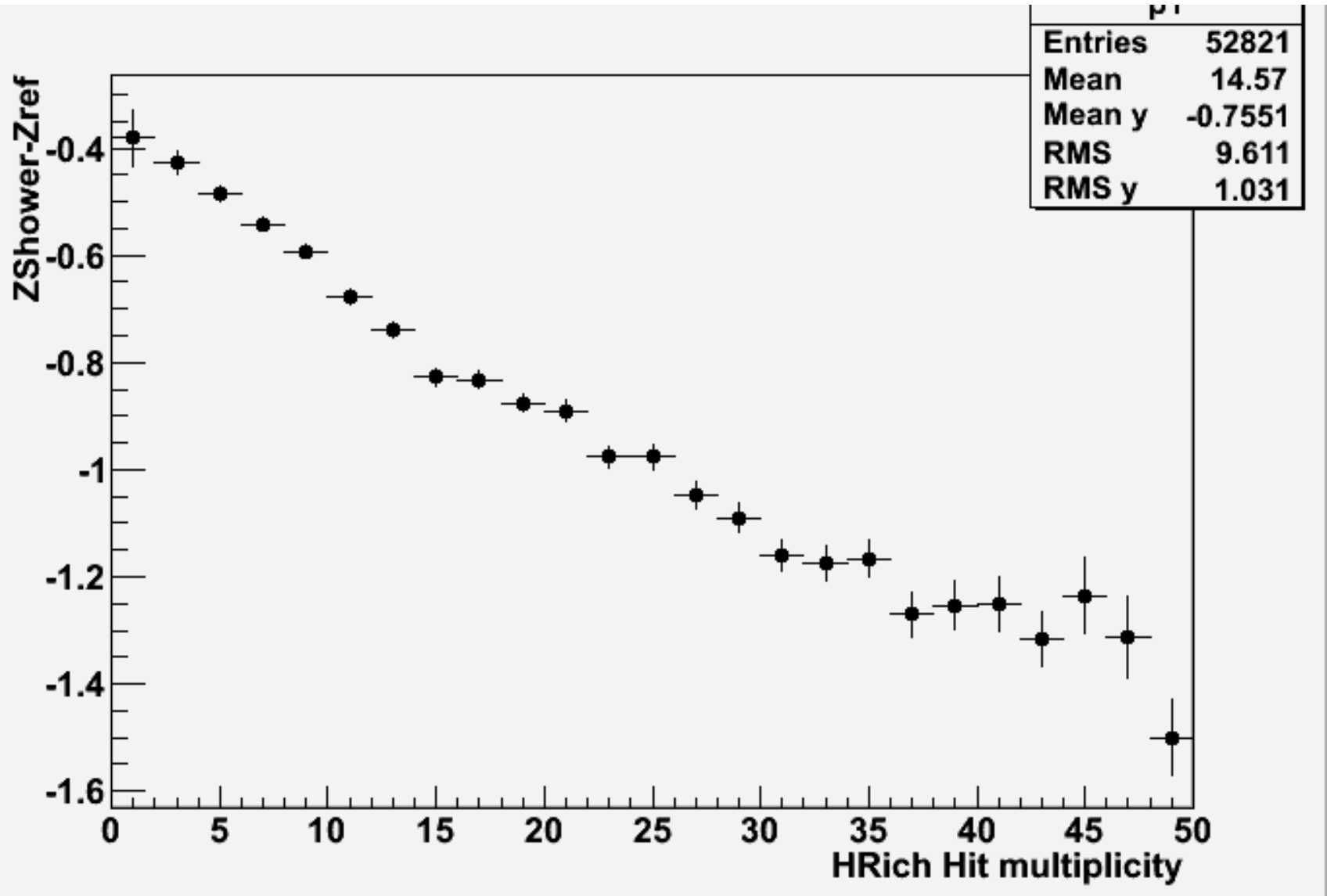
Longitudinal profiles

- A clear shift of both maximum but also fraction of deposit energy in the first layers on ISS and testbeam data
- Systematics under study (how dependent it is on the selection) , more proton-background-> max shifted to the high layer side
- Next Correlation with other detectors

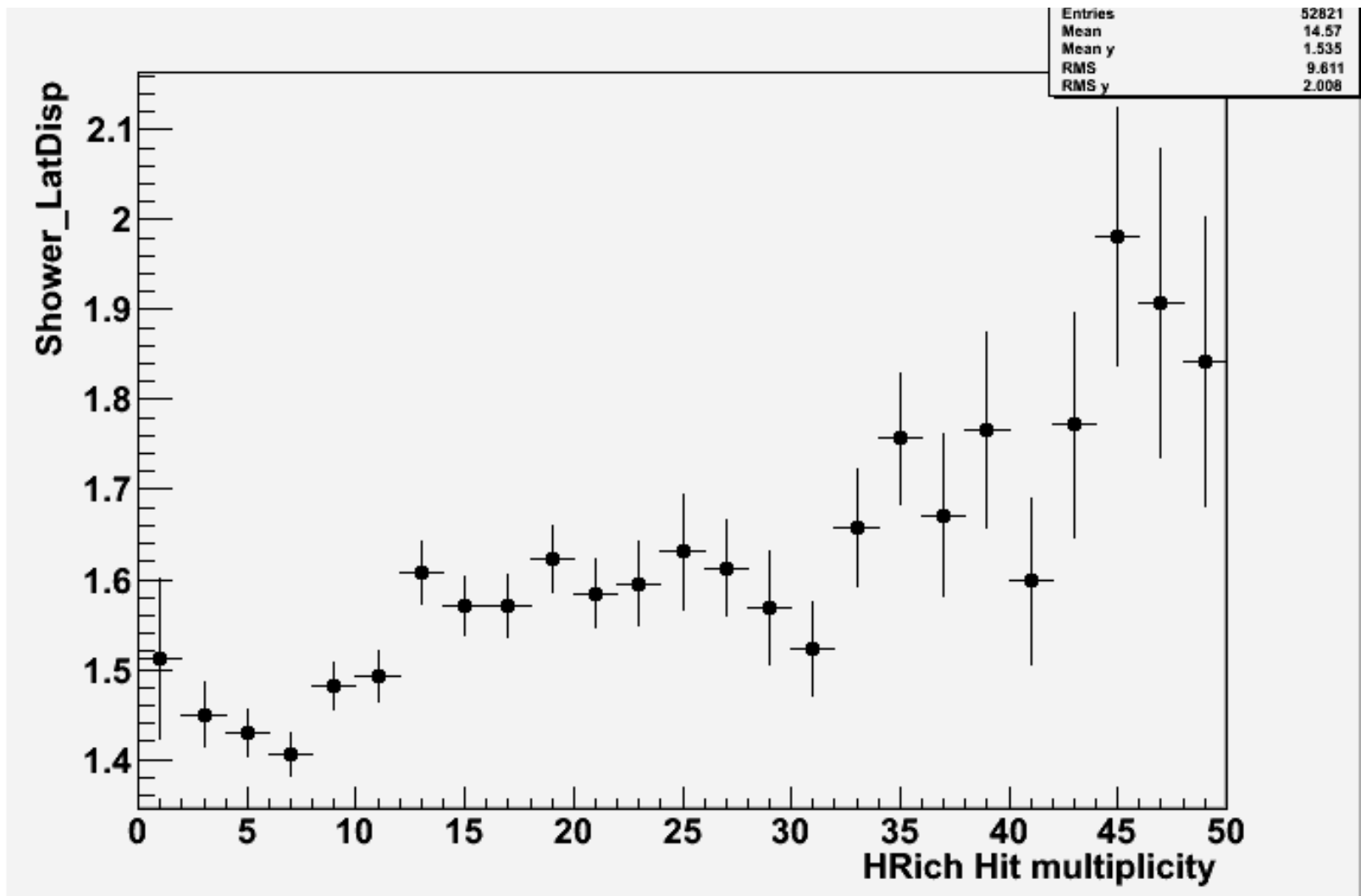
Correlation with Rich



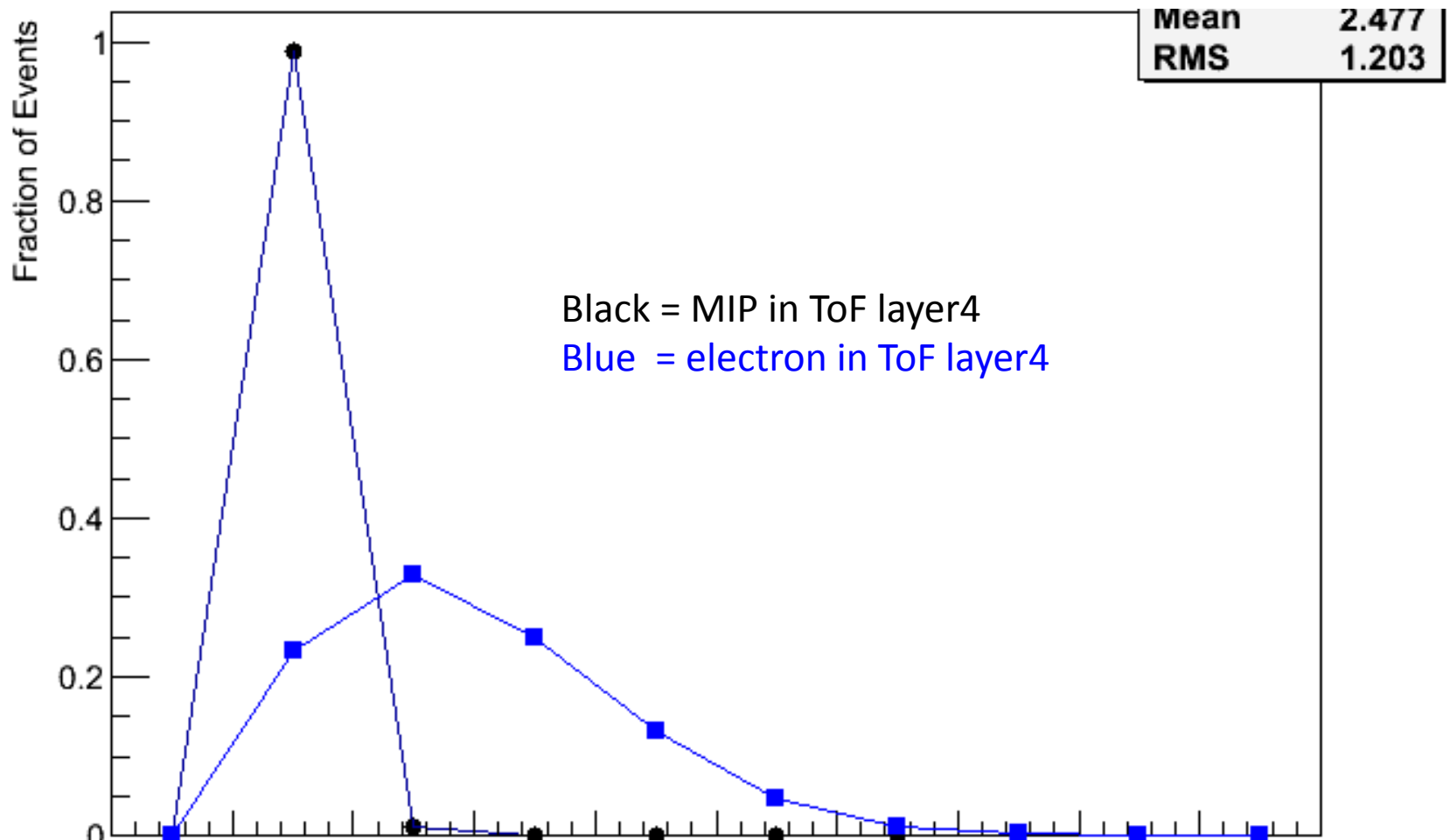
Correlation DeltaZ with Rich



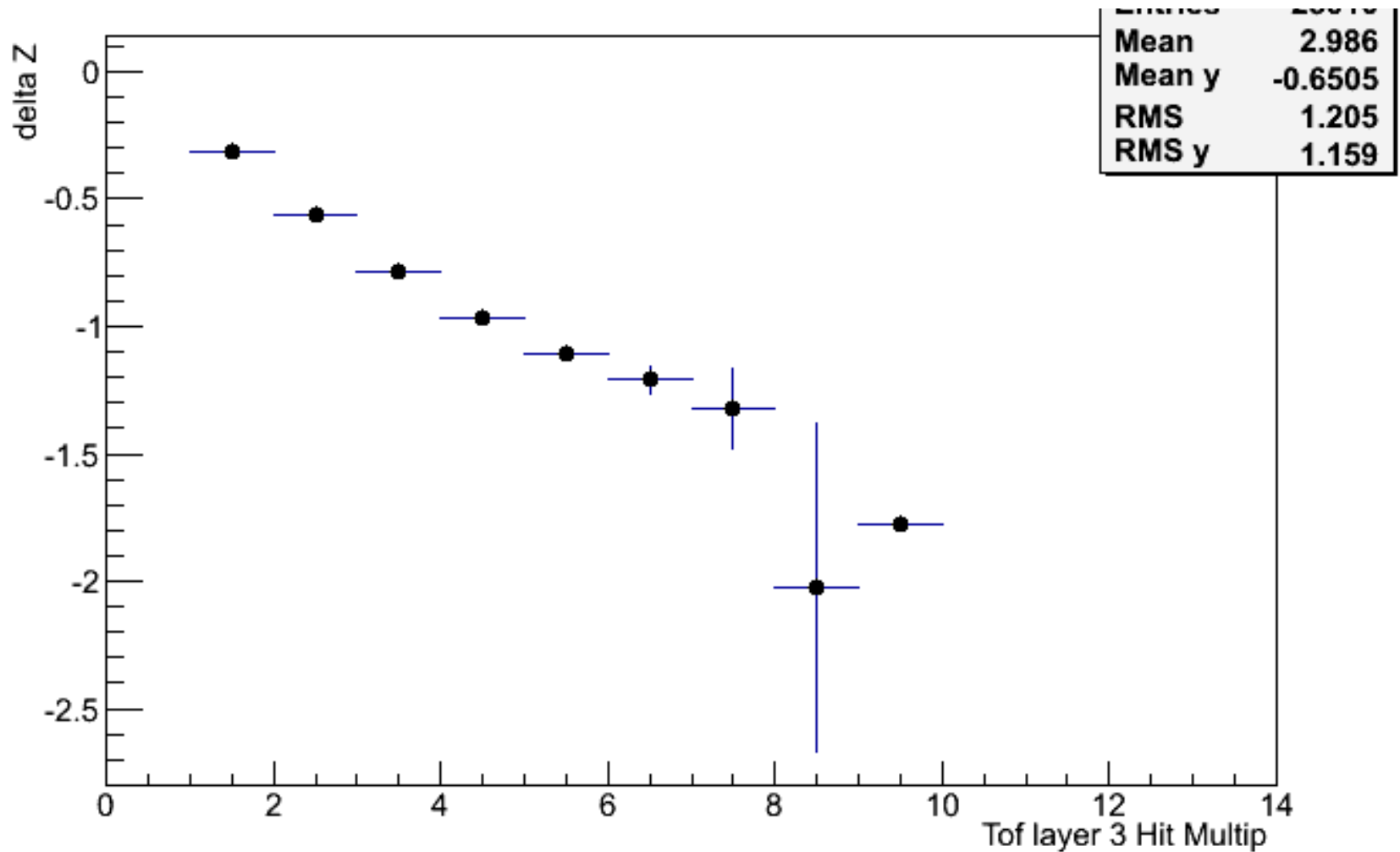
deltaZ versus Lateral dispersion Ecal – layer 1



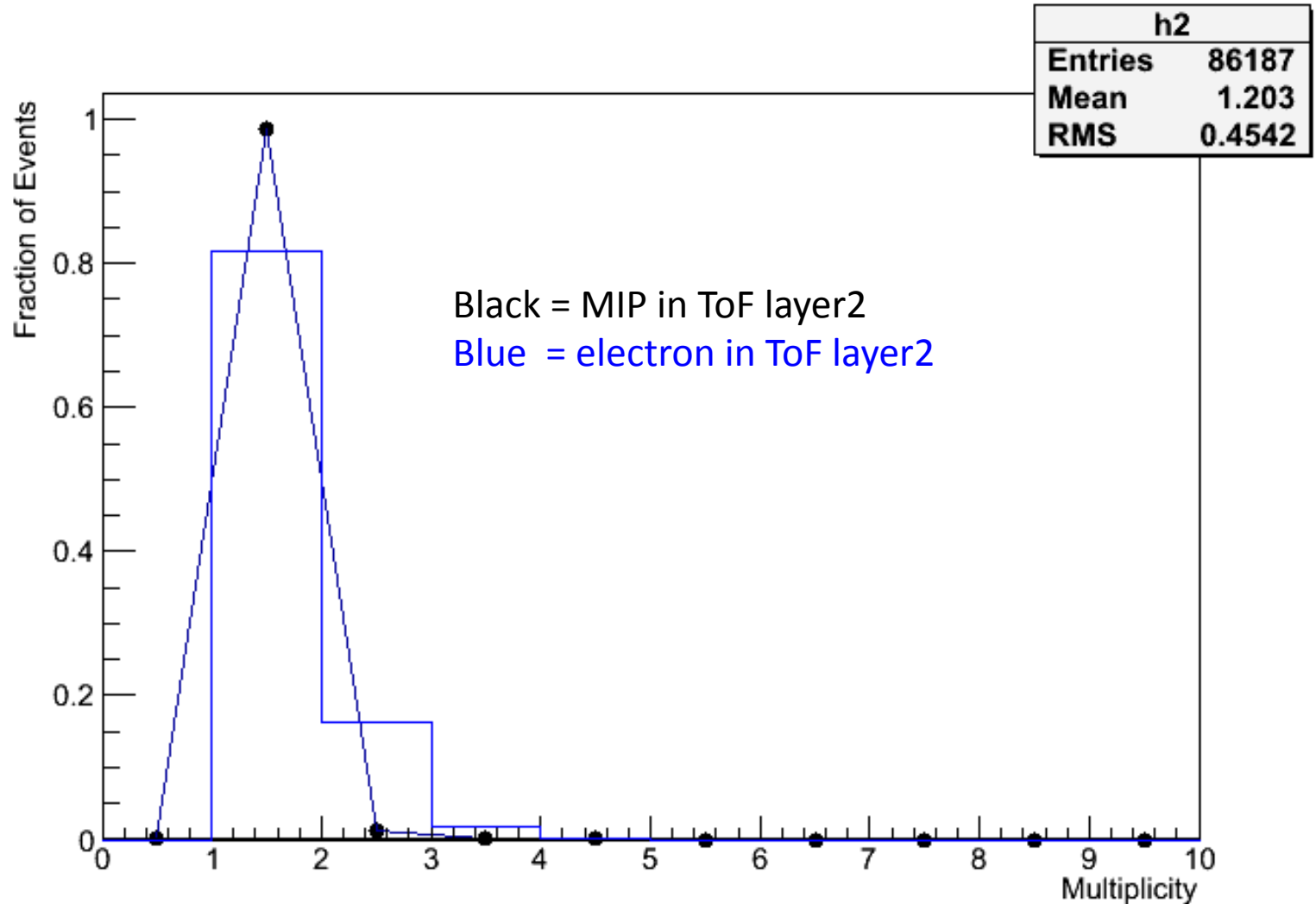
TOF Multiplicity in layer 4



DeltaZ- ToF multiplicity layer 4 correlation



TOF Multiplicity in layer 2



Correlations

- A clear correlation between the longitudinal profile shift and the Rich and ToF multiplicity
- Quantitative effect under study
- Comparison with MC under study