ZDC TB06 preliminary results

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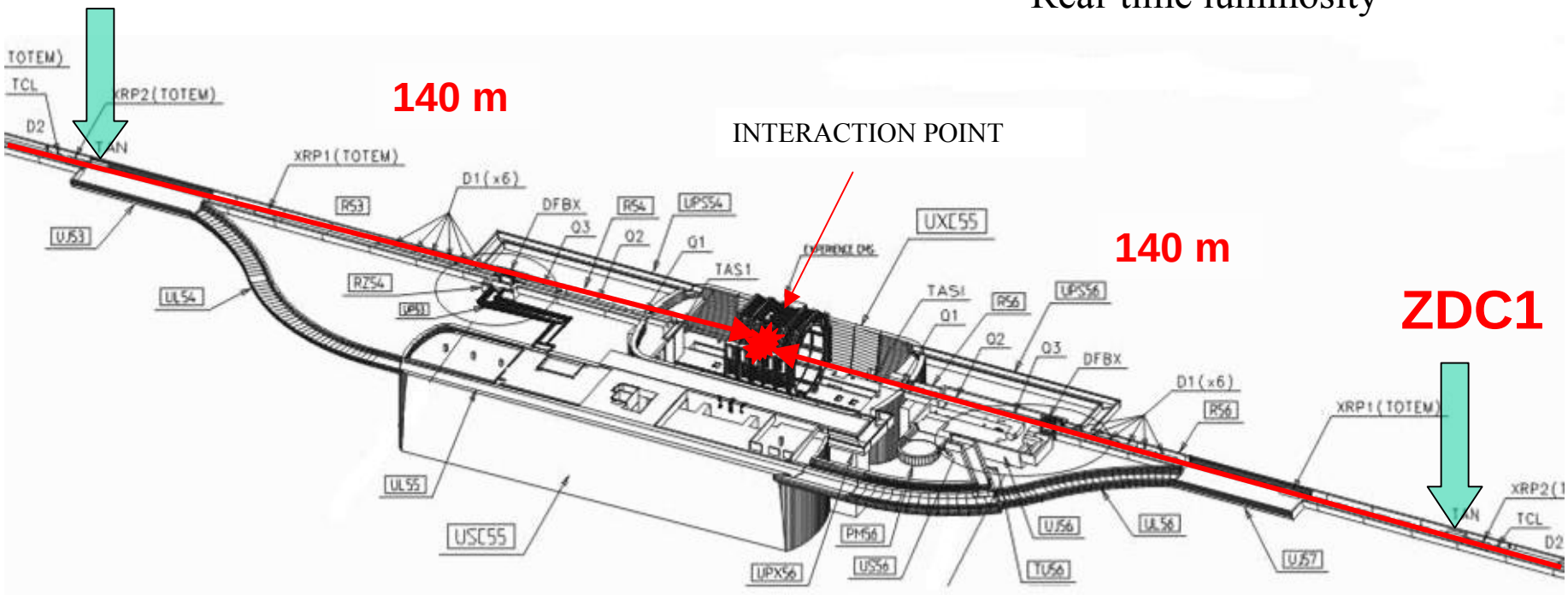
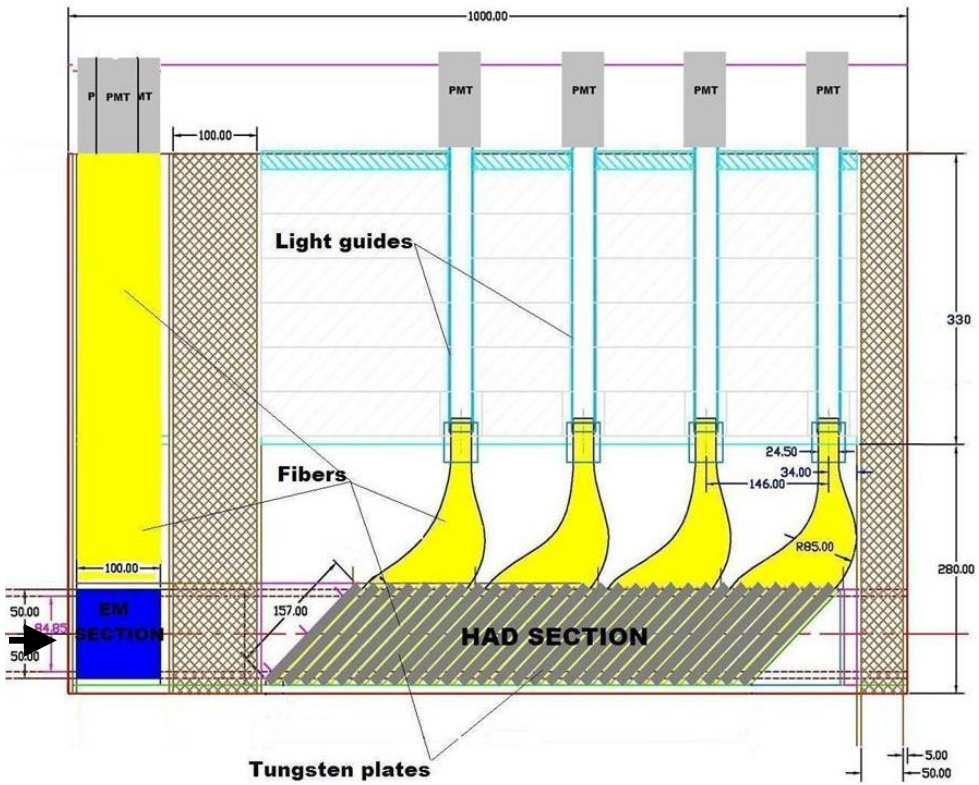
The CMS ZDC

- Physics: (n,γ) η > 8.4
- Trigger (MB, UPC)
- Tuning beams
- Real-time luminosity



POINT 5

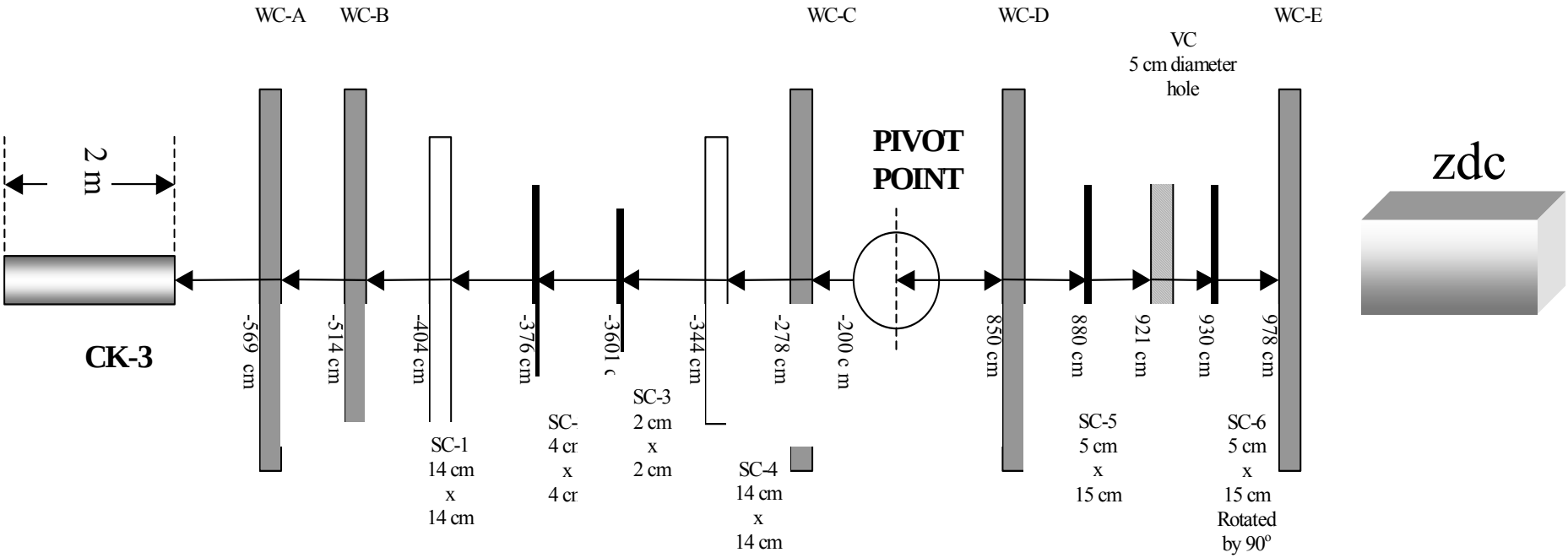
Schematic illustration of the detector's design.



The physical characteristics of the ZDC

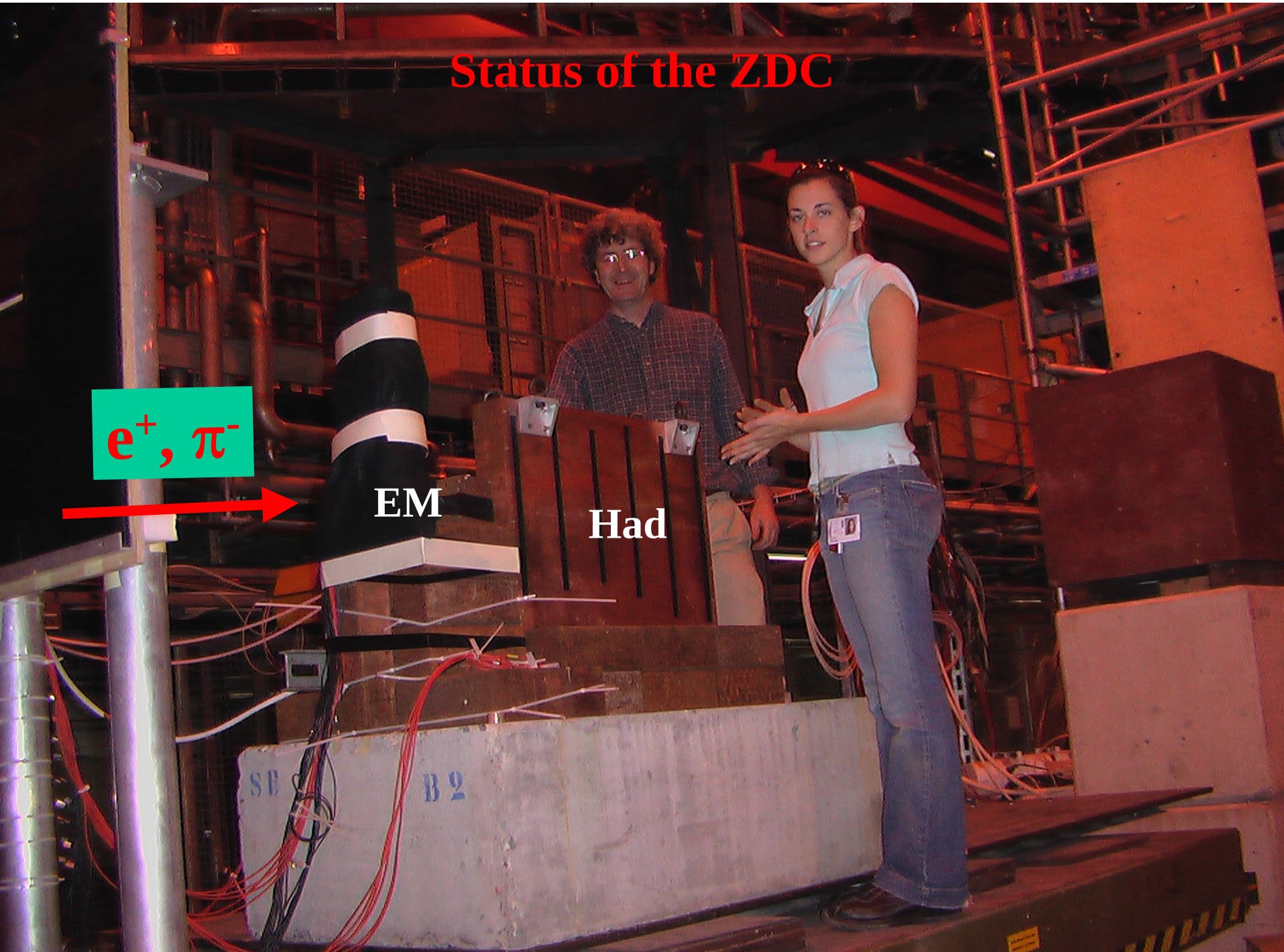
	HAD Section	EM Section
Sampling ratio	15.5mm W 0.7mm Q	2mm W 0.7 mm Q
Number of cells	24	33
Number of Nuclear Interaction (Radiation) Length	~5.6 λI	(~19Xo)

Test Beam Setup Diagram



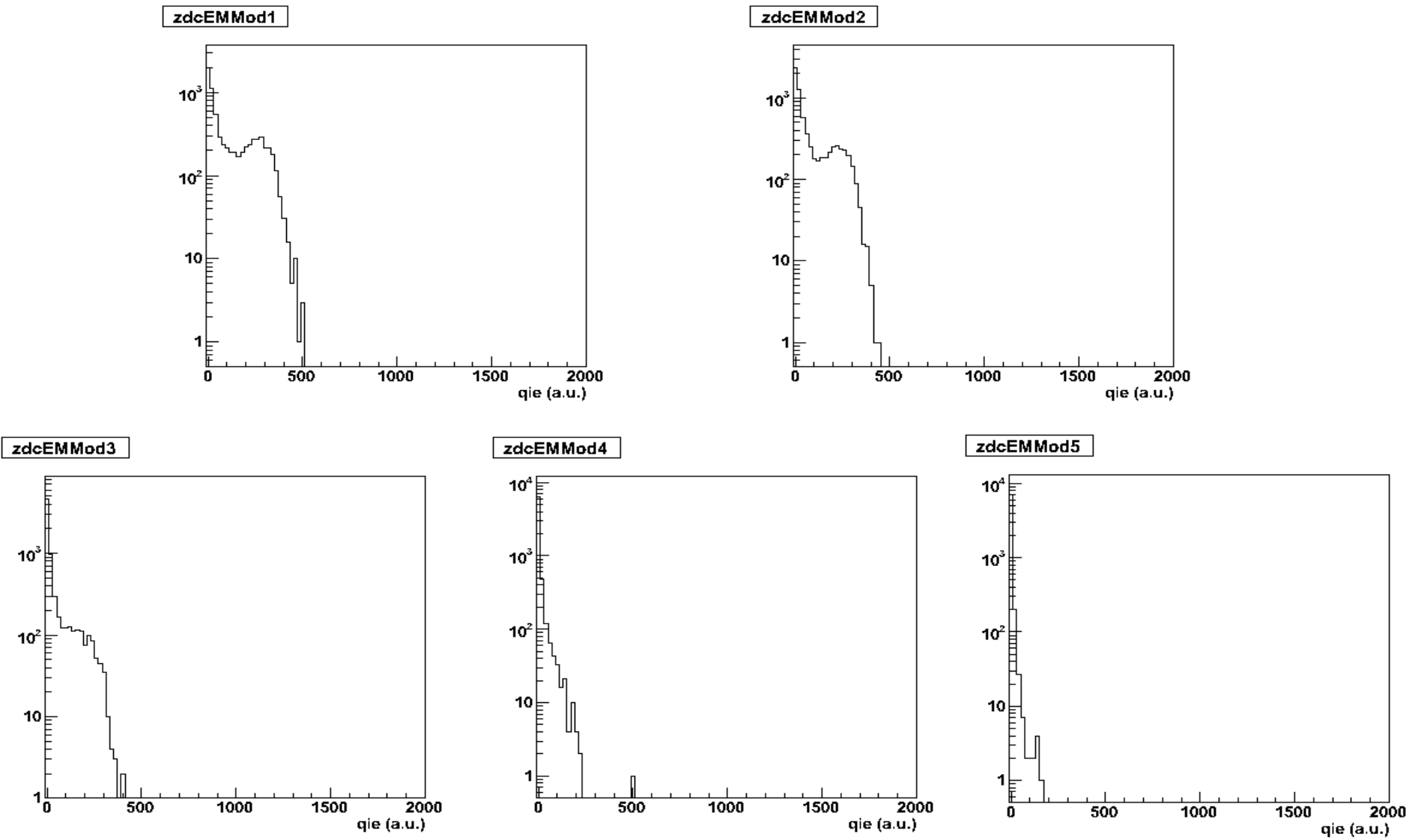
Floor to beam = 246 cm
All WC = 10 cm x 10 cm
All SC = 1 cm thick

Status of the ZDC

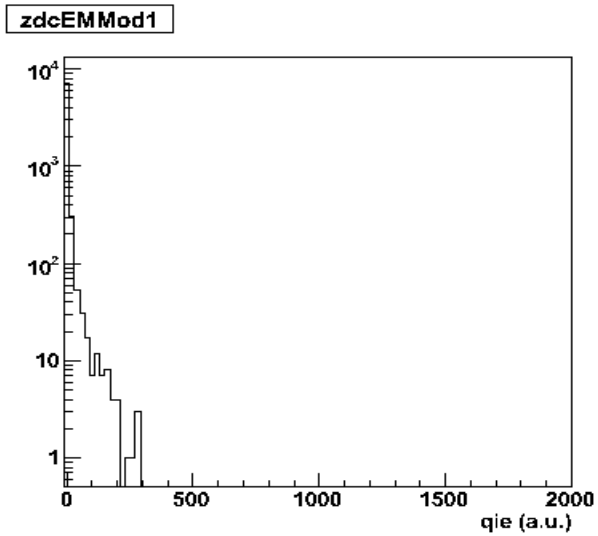


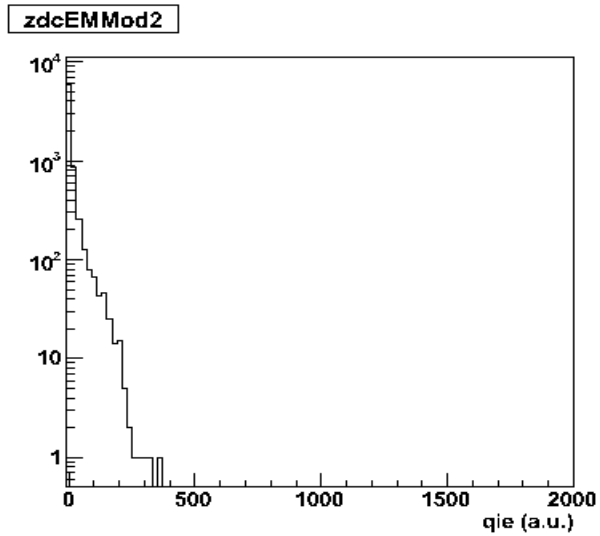
ZDC Section	Beam, momentum (GeV)	Type of Measurements
EM Section	positrons (e +) 20, 50, 100	1. Gain – matching scans trough all 5 towers: 5 points (center of each tower), one energy (50 GeV) 2. Momentum scan to investigate linearity, energy and position resolutions: 5 points (center of each tower), at least 3 energy 3. Detail position scan to investigate uniformity of response 55 points (11x, 5y), one energy
HAD Section	Pions (π -) 50, 100, 150, 300	1. Momentum scan to investigate linearity, energy and position resolutions: One central point , 4 energies 2. Detail position scan to investigate uniformity of response: 25 points (5x , 5y), one energy (300 GeV)
HAD and EM Sections	e + 50 π - 300	1. High statistics momentum/position scans to investigate particle identification by shower shape

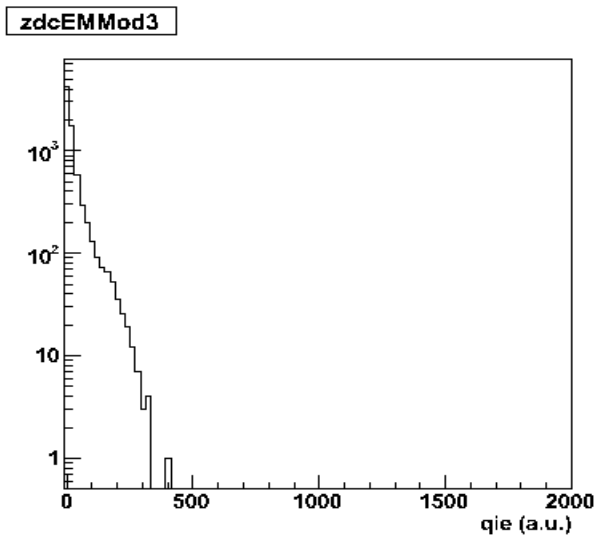
Run 28061: EM 20 GeV beam aimed to Tower1 (EMMod1)

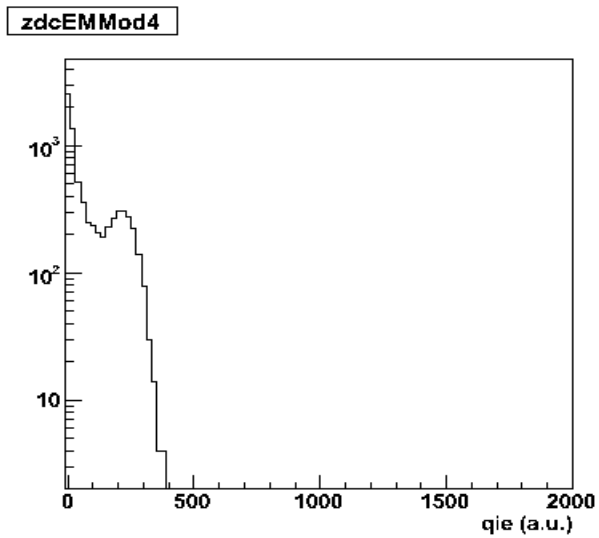


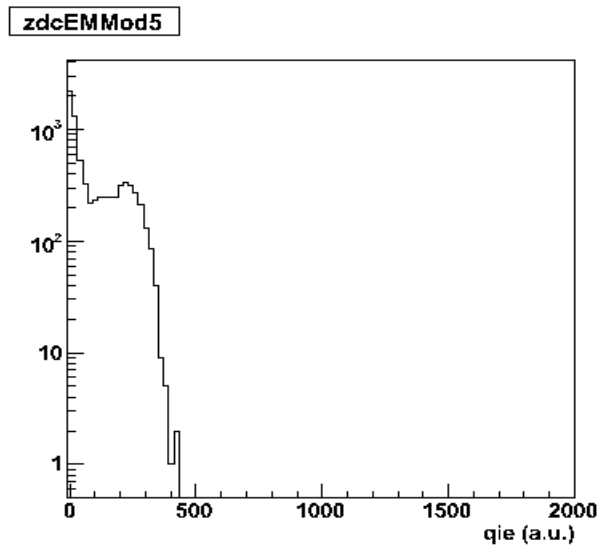
Run 28046: EM 20 GeV beam aimed to Tower5



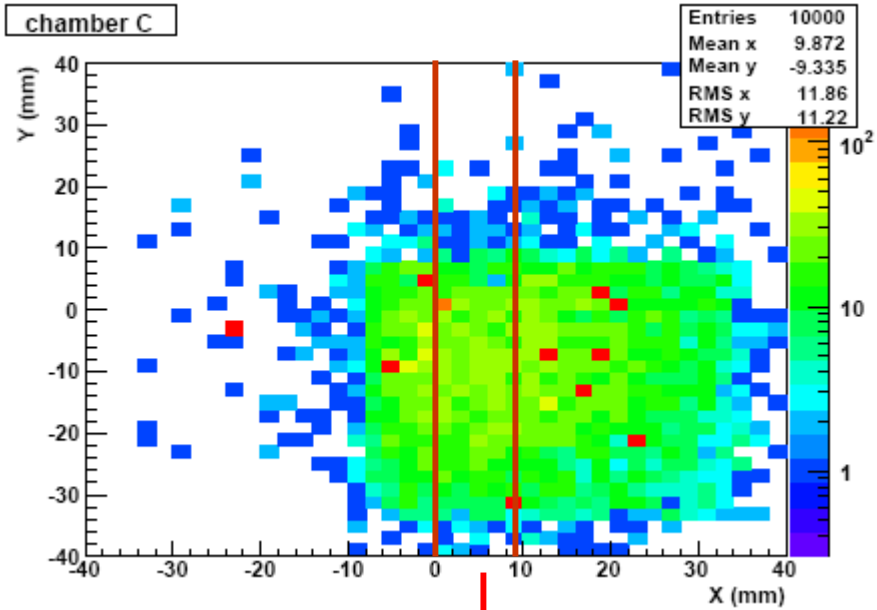


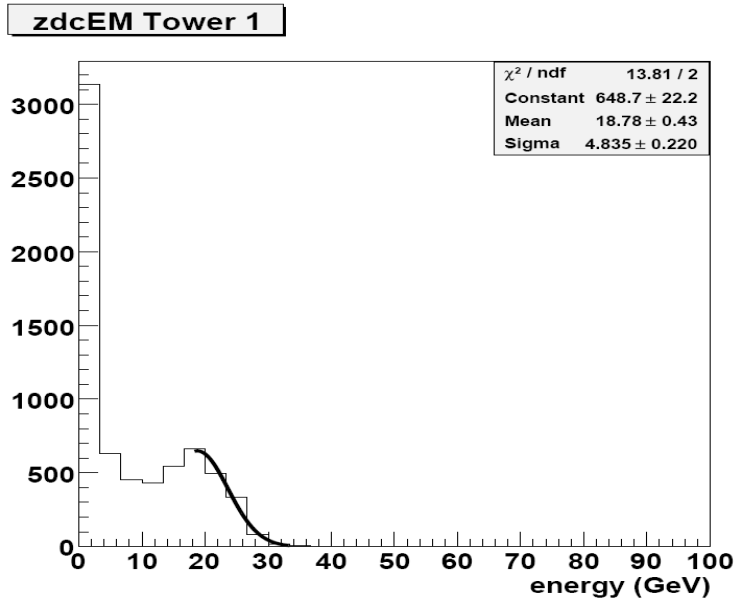


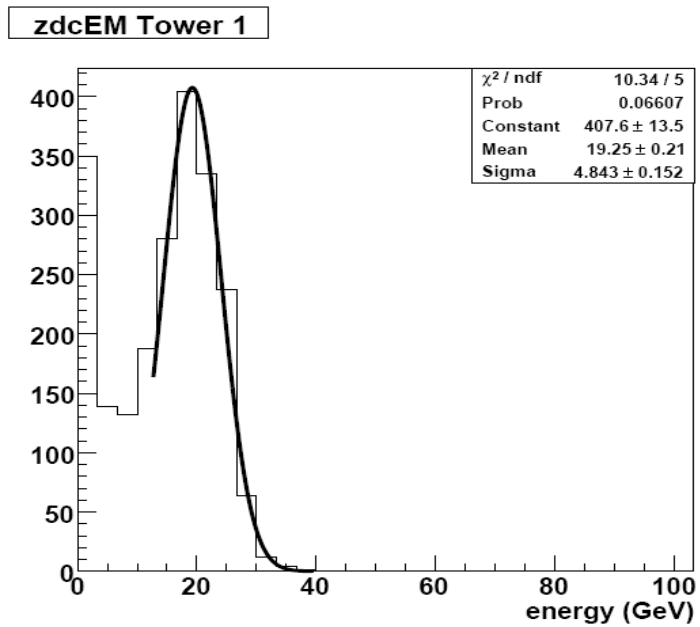




Run 28061- beam 20 GeV e+

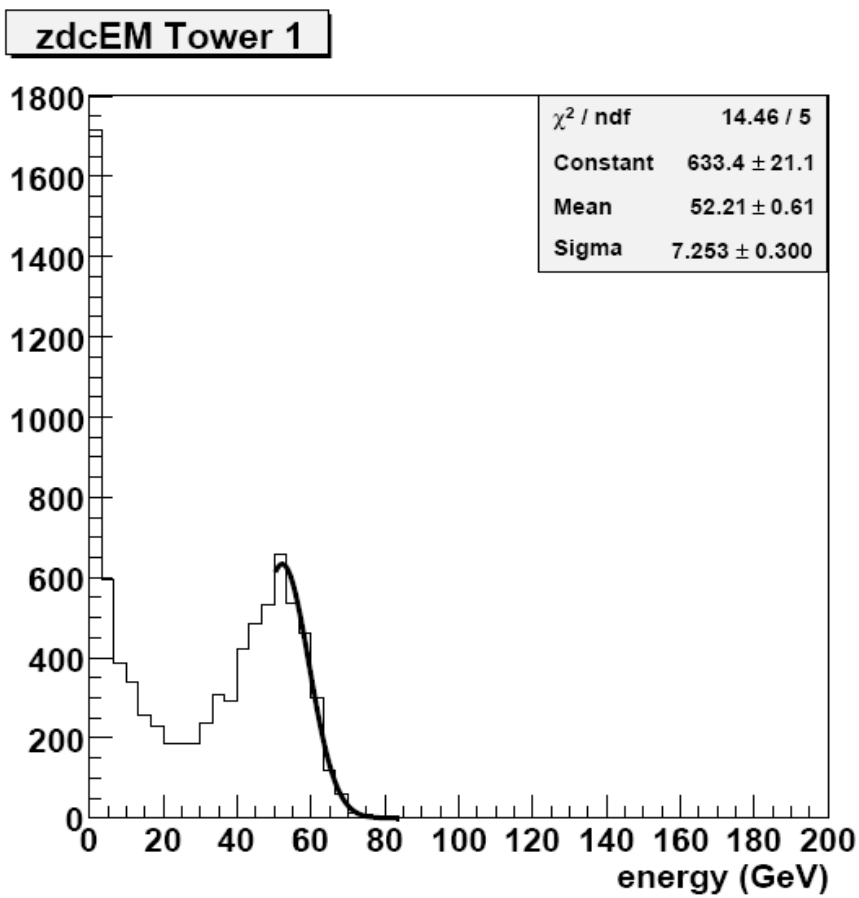




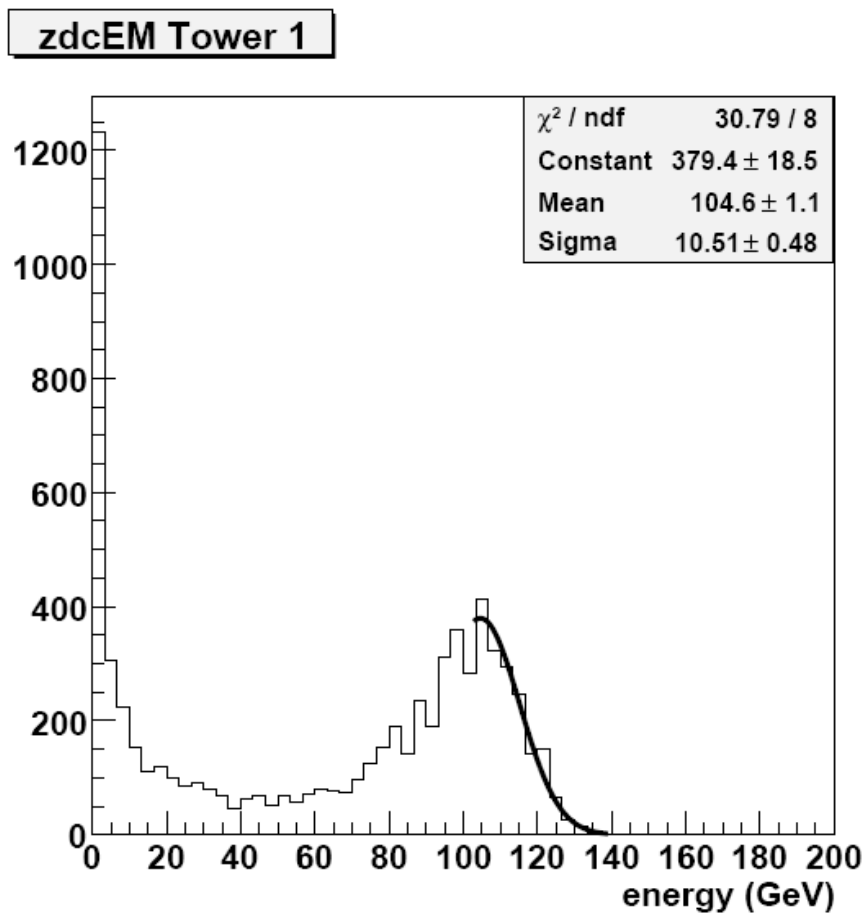


Cut in WCCX [0 – 10 mm] to reduce background for this energy

EM Tower 1

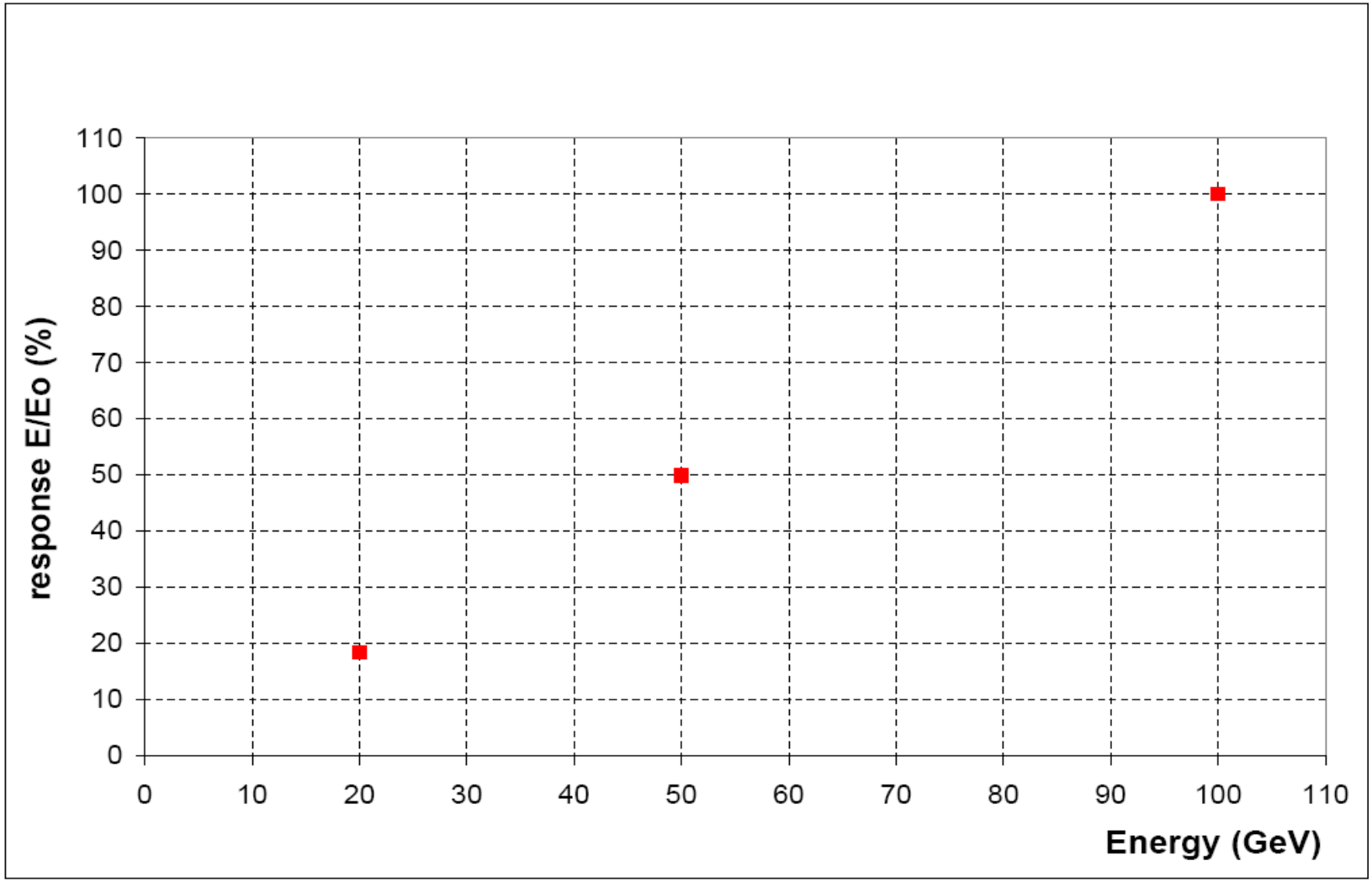


Run 281088: 50 GeV pion

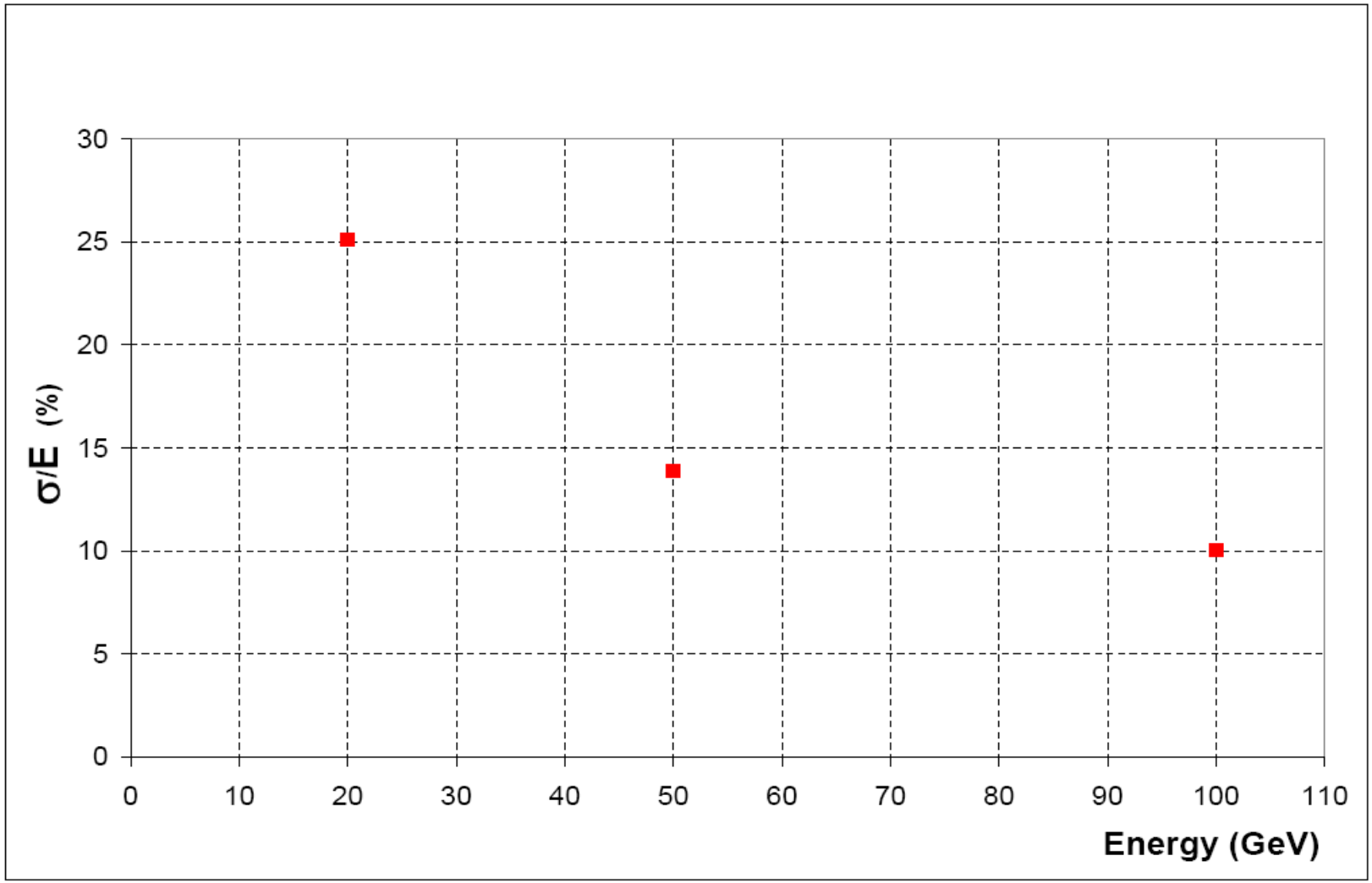


Run 28065: 100 GeV pion

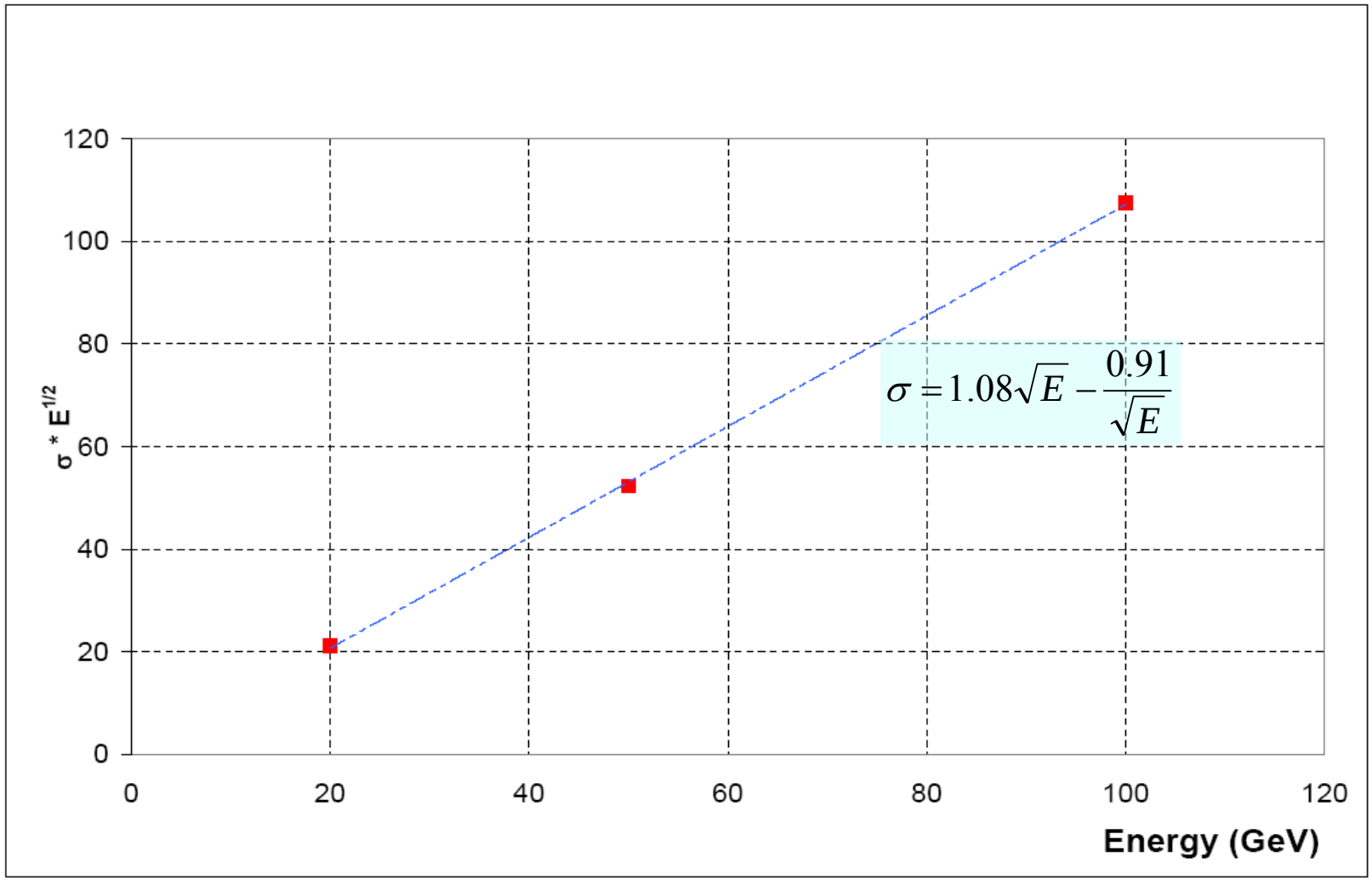
EM Tower1 Linearity



EM Tower1 resolution

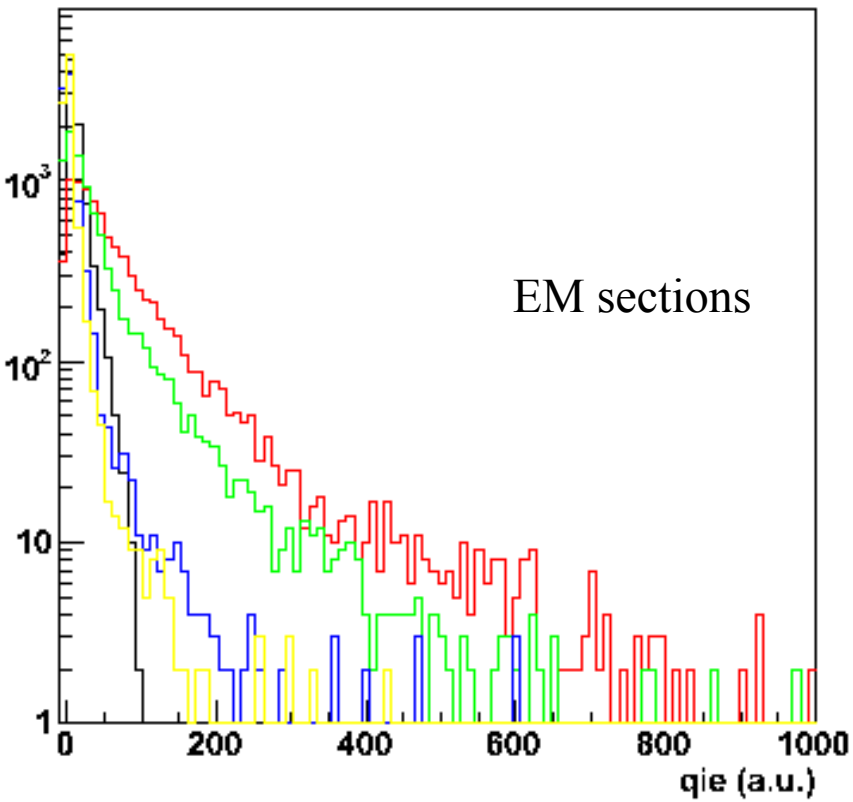


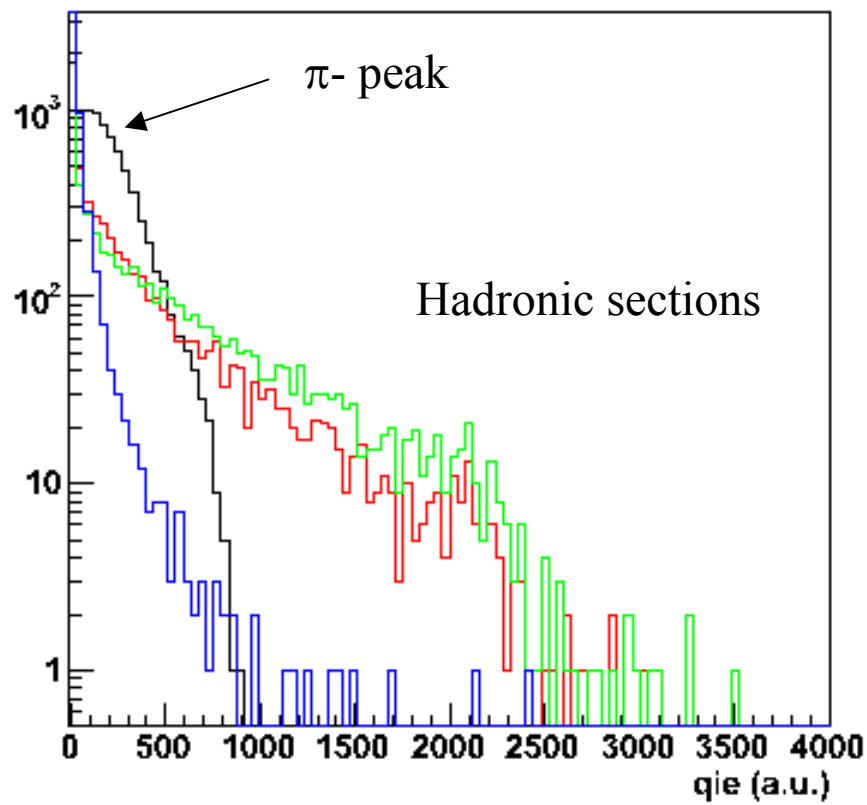
EM tower1 resolution fit



Hadronic Section – First Try

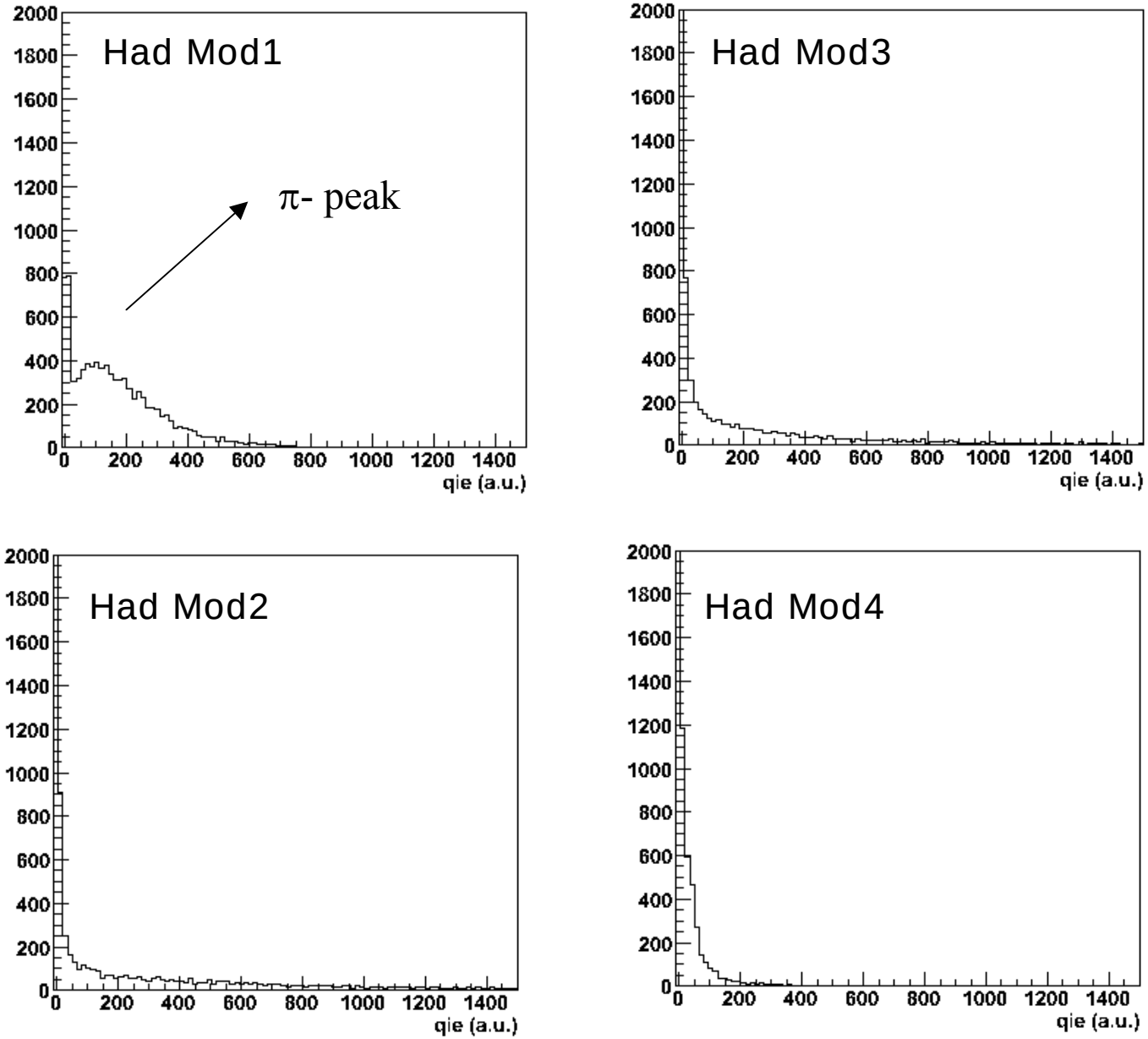
Run 28142: 300 GeV pions at "center" of calorimeter





Black module1, red module2, green module3, blue module4, yellow module5 (EM section)

Individual Hadronic Modules: 300 GeV center (run 28142)

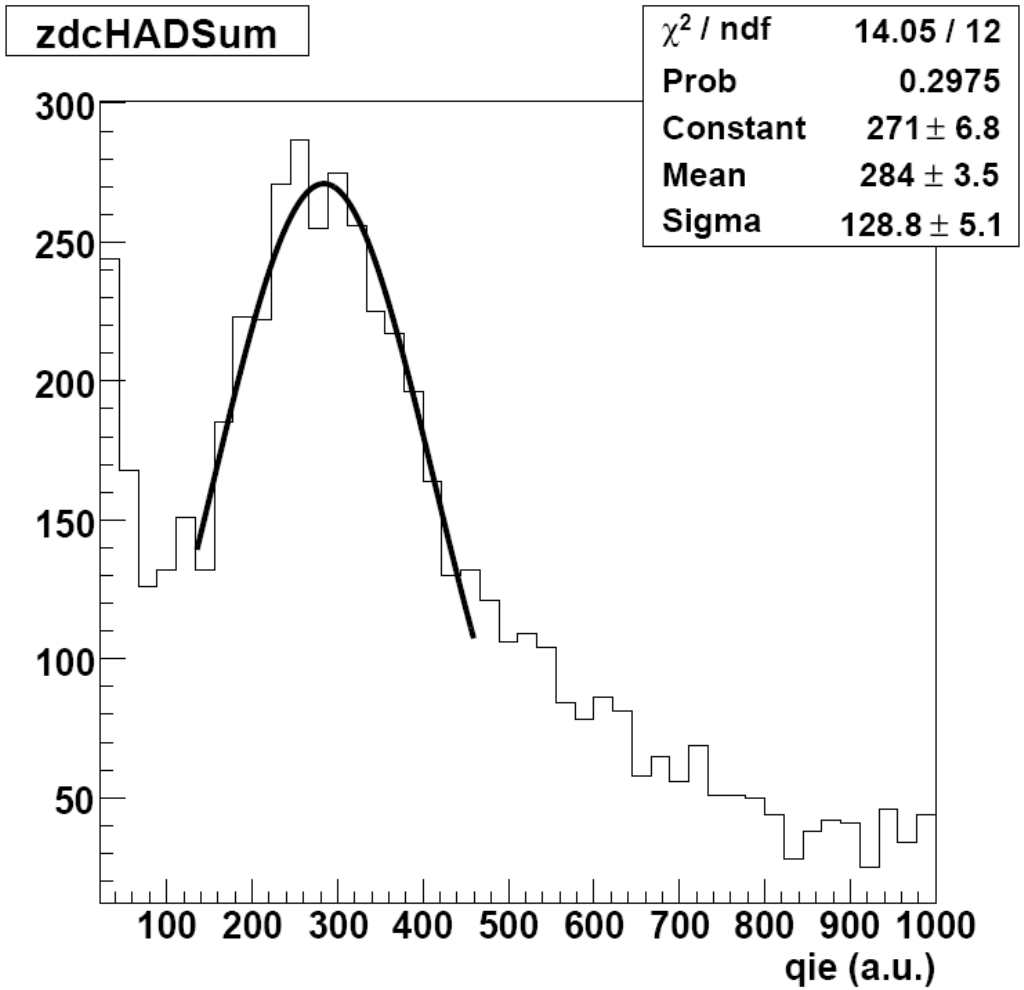


Hadronic "simple sum"

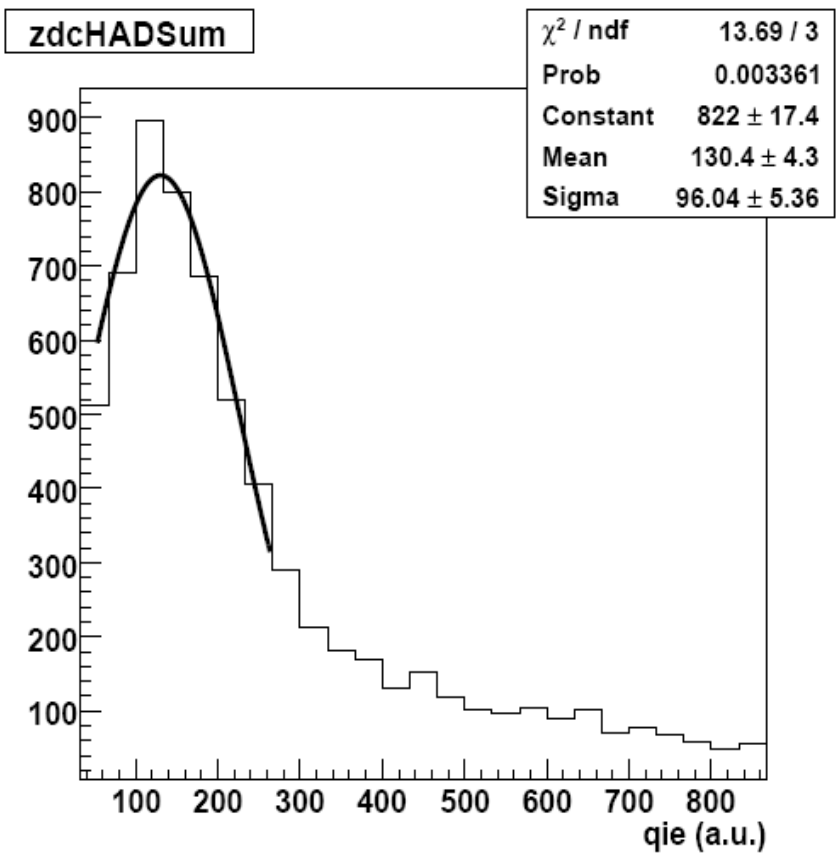
- Run 28142 300 GeV pions at the center of calorimeter
- Sum of modules 1 to 4
- No gain match, simple sum for now:

Sum = mod1+mod2+mod2+mod4

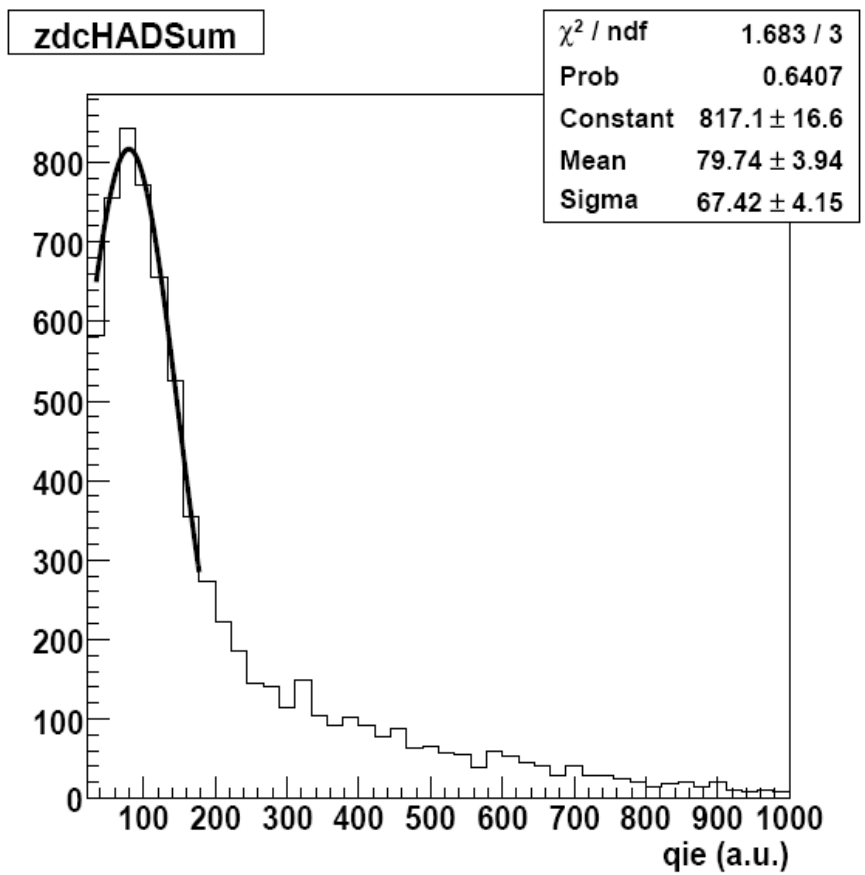
- QIE (channels) units



Hadronic simple sum cont.

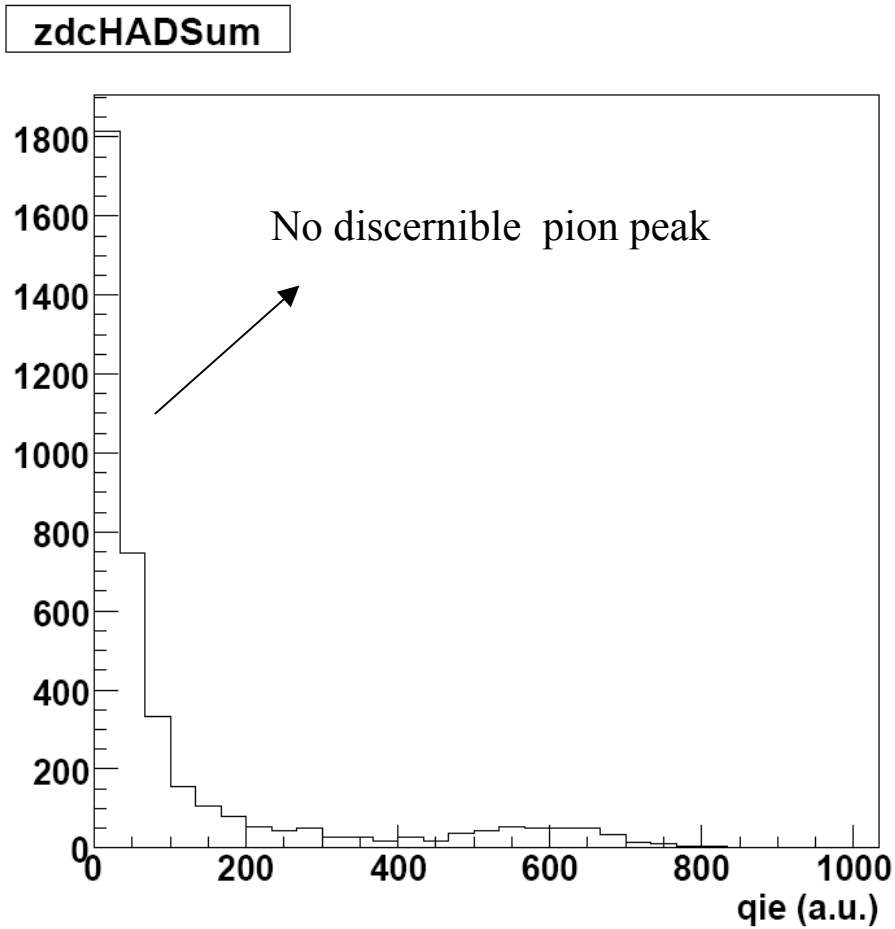


Run 28156 150 GeV pion at center



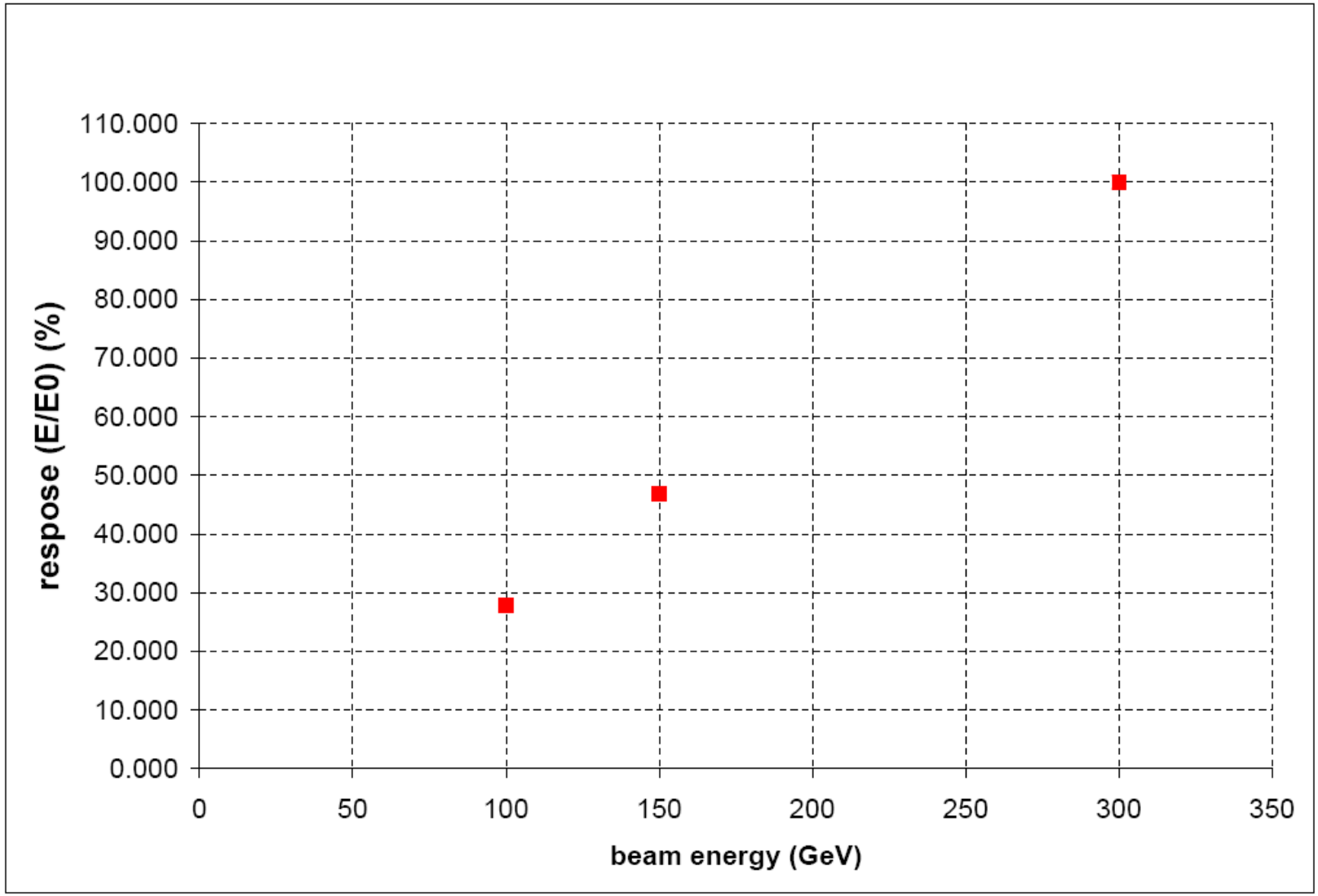
Run 28159 100 GeV pion at center

Hadronic simple sum cont.

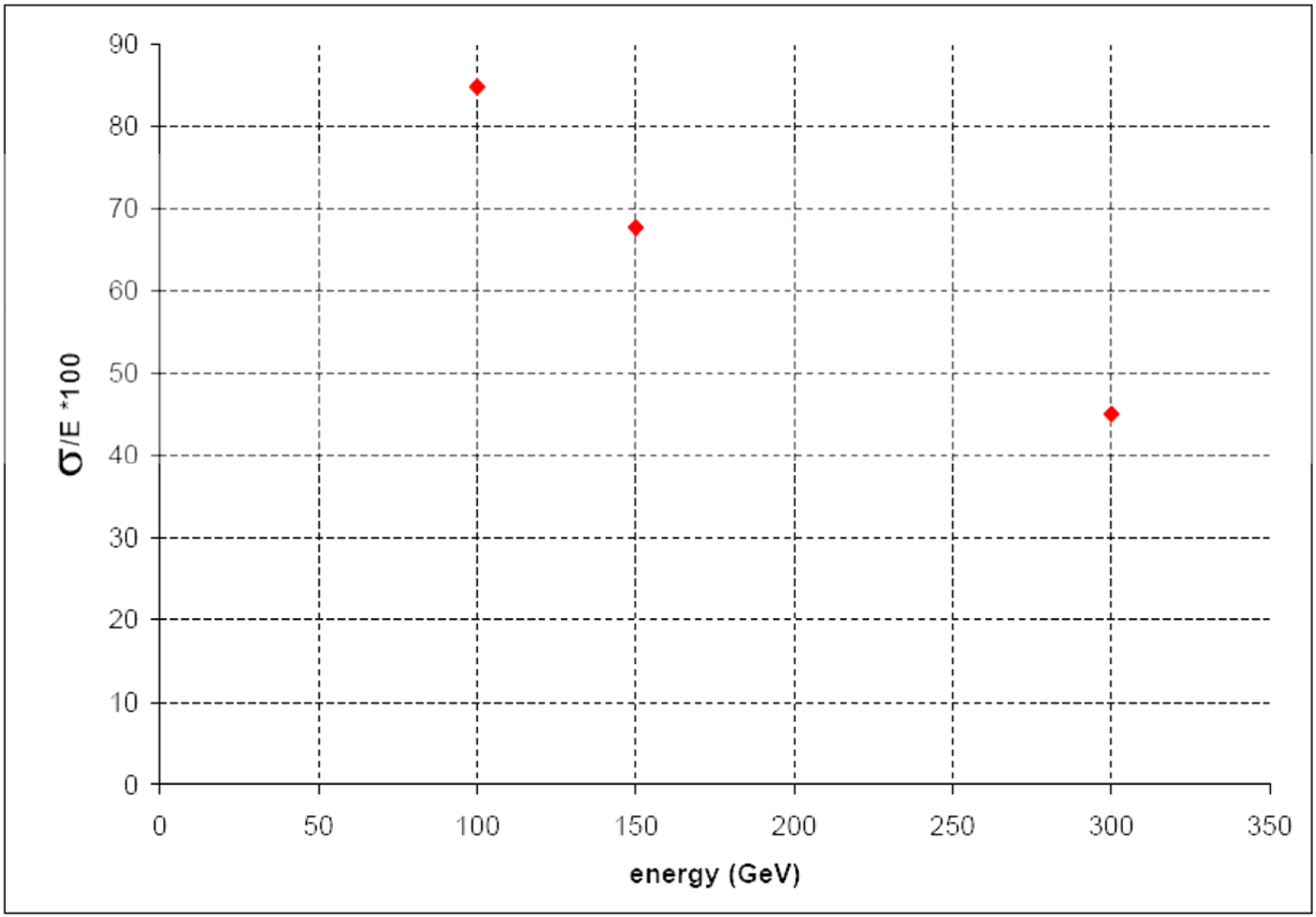


Run 28165 50 GeV pion at center

Hadronic linearity



Hadronic resolution



To do list

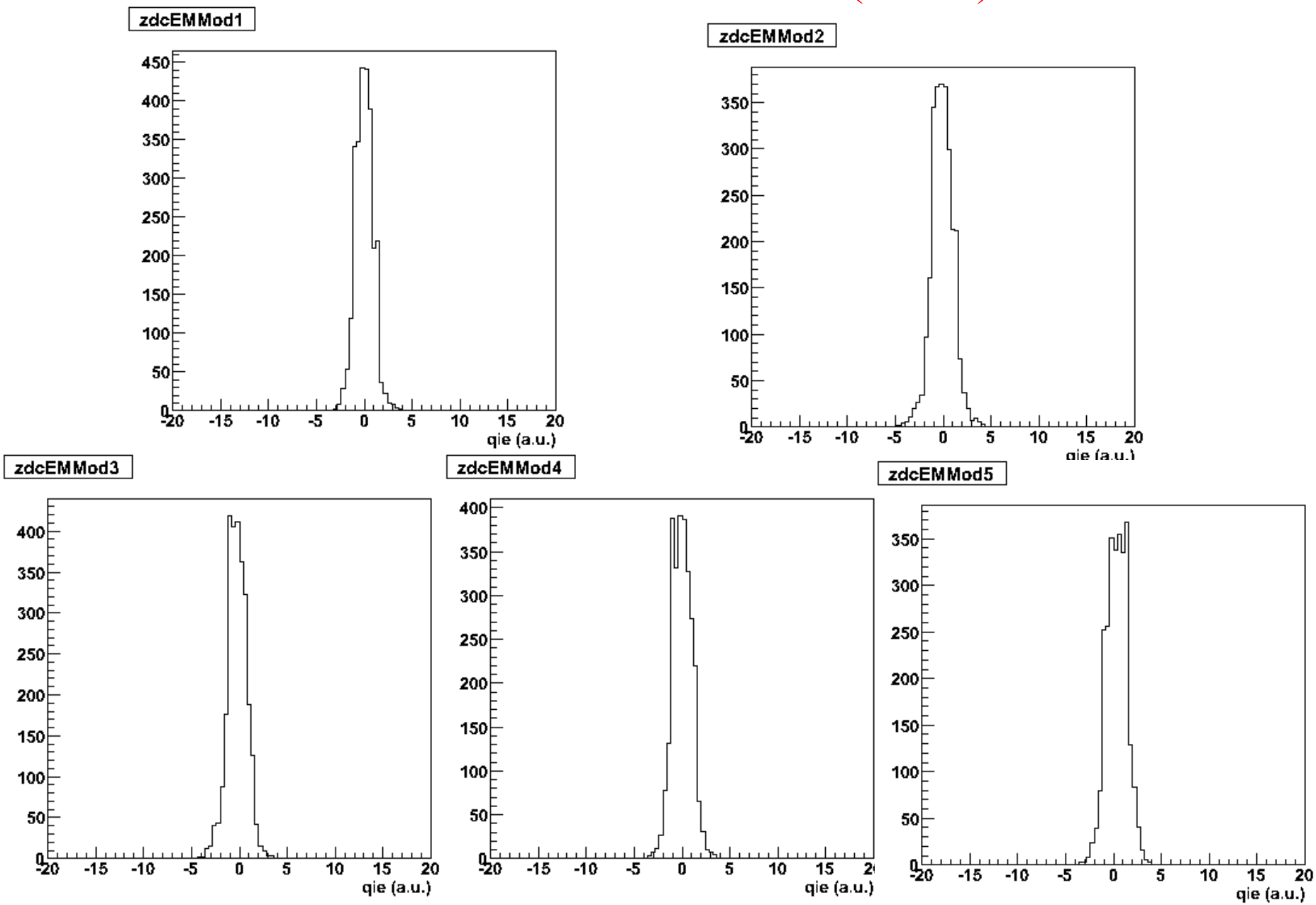
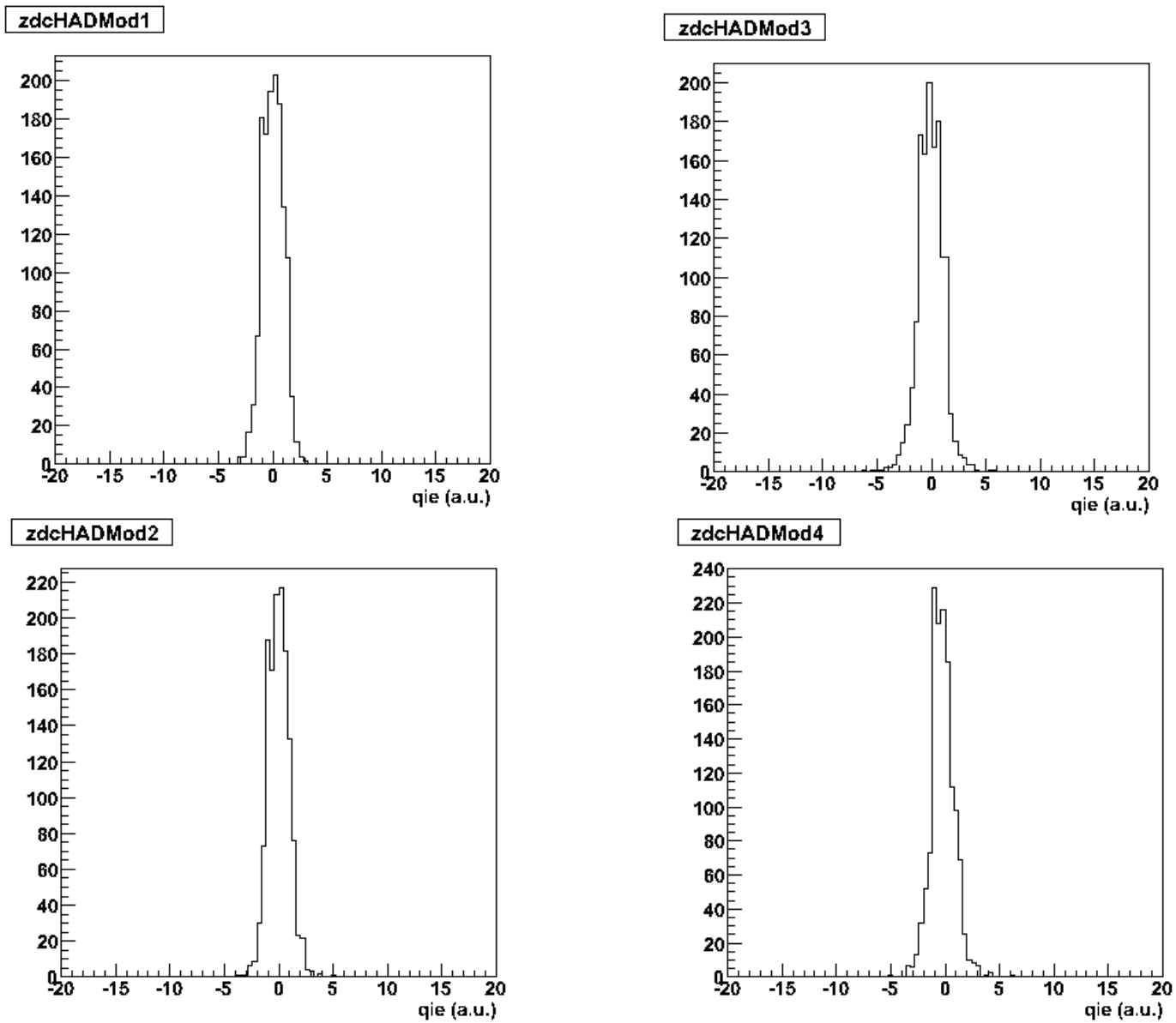
- Analyze all EM towers
  - Cut on wire chambers to reduce background →Better resolution
- Work on calibration (GeV) for hadronic part
- Work on gain match for hadronic part
  - By iterative optimization of the sigma of the sum

- So far things are looking good:

  Thanks to everybody that helped us!

Extra transparencies

Pedestals run 100 GeV e+ (28065)



Pedestals run 300 GeV π- (28142)