

# Charge and Velocity Studies with the CERN Test Beam October 2003

L. Arruda,  
F. Barao, J. Borges, P. Goncalves, R. Pereira  
LIP

# Outline

- Radiators analysed
- Data selection
- Velocity reconstruction
- Charge Reconstruction
- Npe analysis
- Conclusions

## Radiators studied

Manufacturer	Index	Size (l*l*h mm <sup>3</sup> )	Label	Run Nb	Comments
Novossibirsk	1.03	100 X 100 X 31	CIN1.03G	538	Tested 2003
Novossibirsk	1.05	55 X 55 X 55	CIN1.05	607	Tested 2003

## Reconstructions:

Velocity and Charge reconstructions are done during the production and stored in 2 different blocks in the ntuple: BETA2 and CHARGE2

# Data Selection

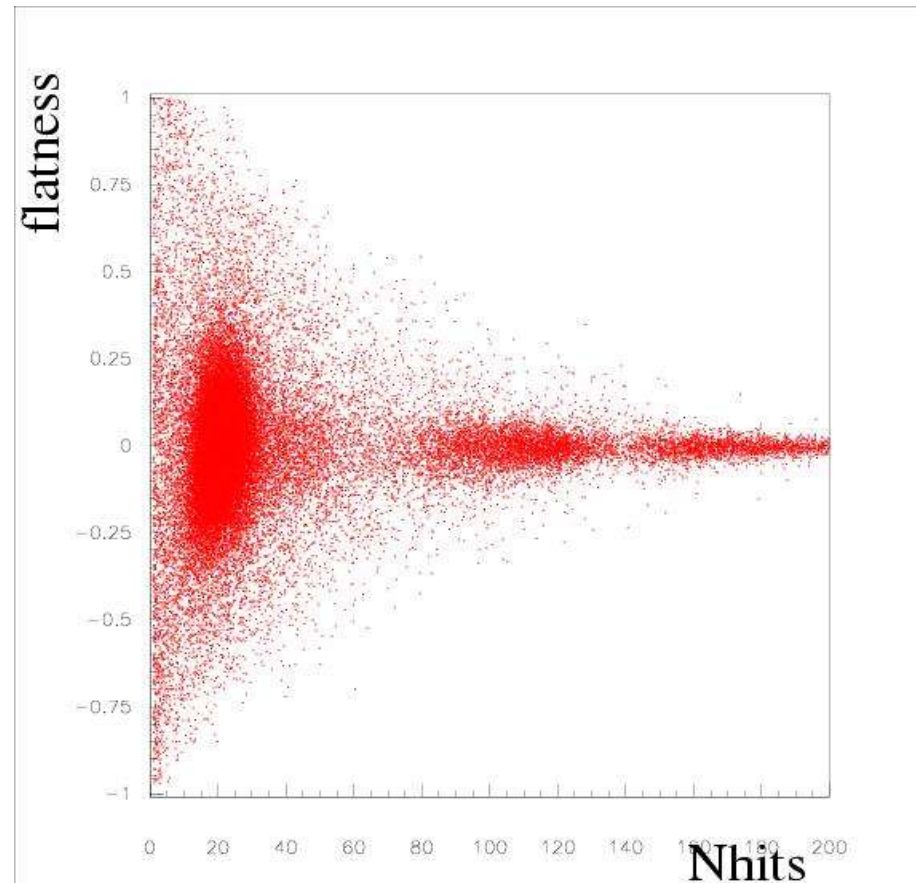
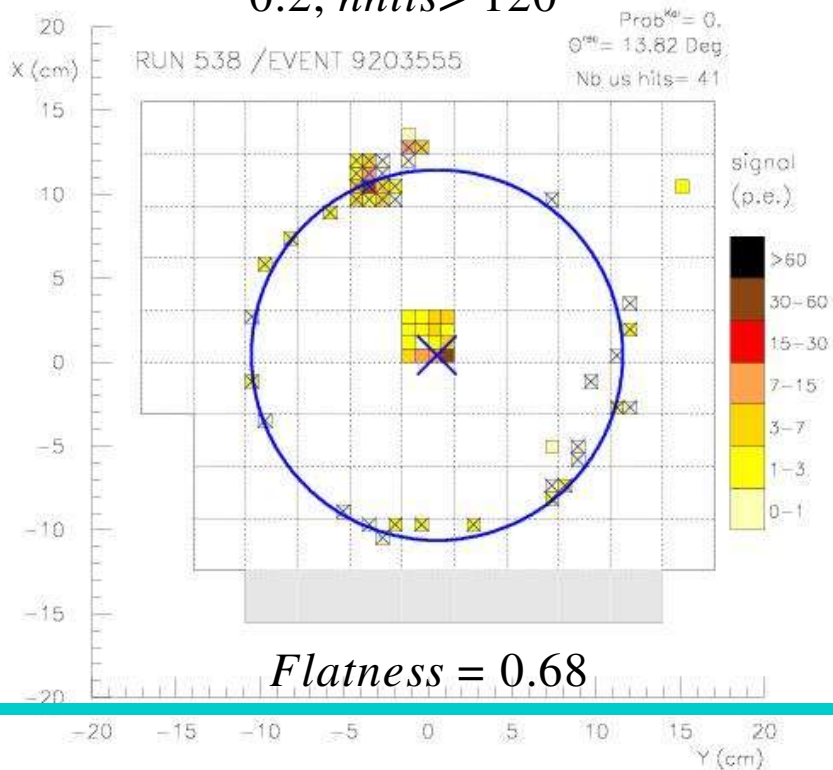
→ *Cerenkov ring flatness* – requirement of the hits azimuthal uniformity for particles with an incident angle = 0

$$\sum w_i \cos(\phi_i) / \sum w_i; w_i = \text{signal}$$

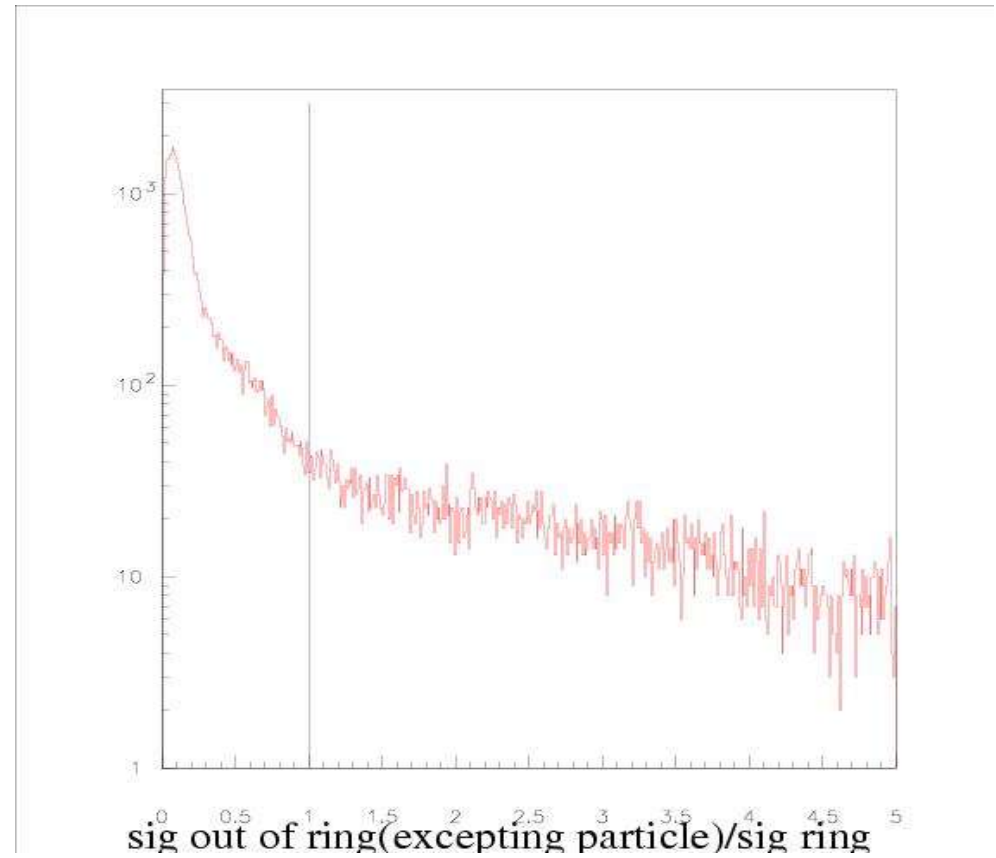
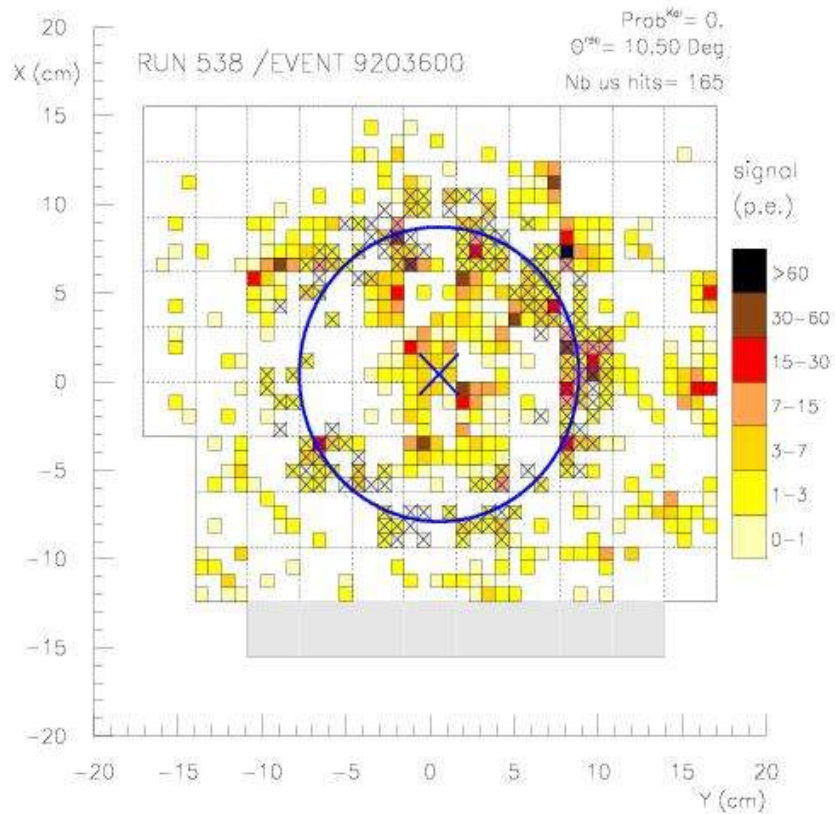
0.7,  $nhits < 20$

*Flatness* < 0.4,  $20 < nhits < 120$

0.2,  $nhits > 120$

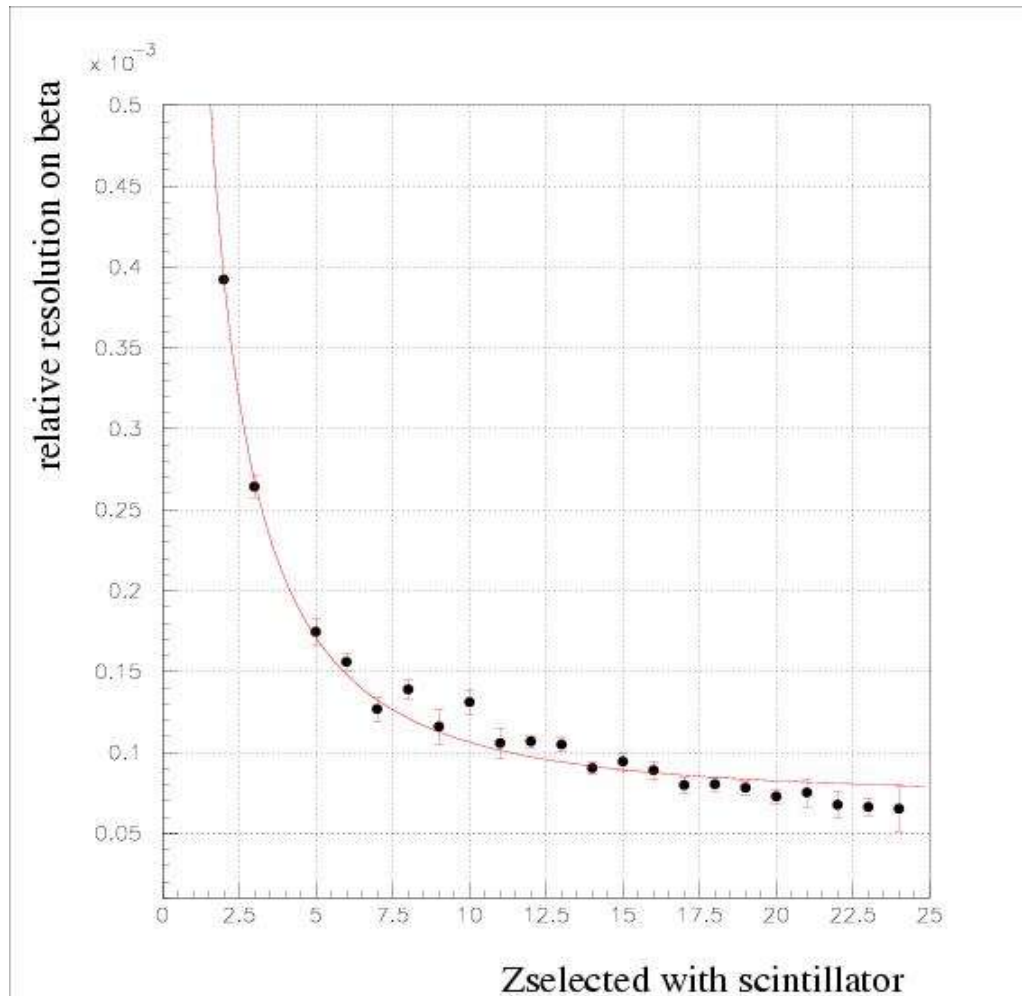


→ *Event Signal* – requirement of a small noisy/ring signal



Signal ratio ~ 1.8

## Velocity reconstruction CIN1.03G (run 538)



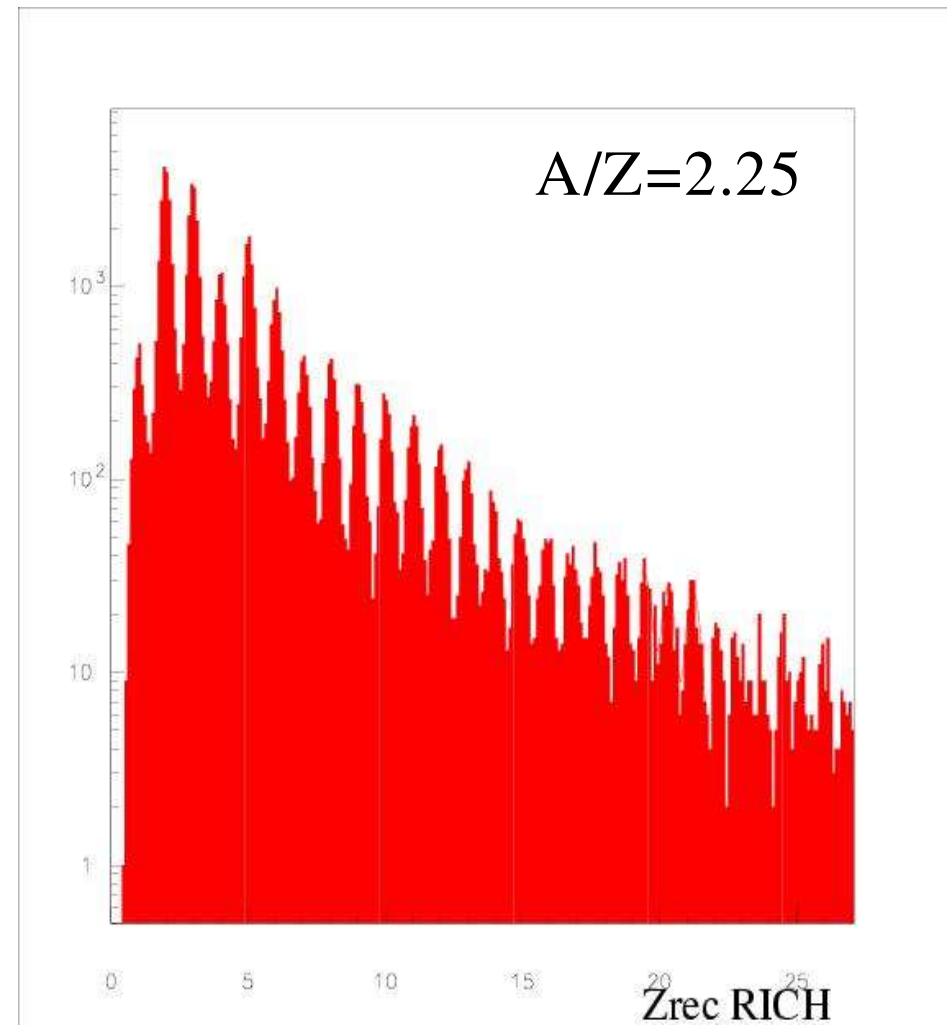
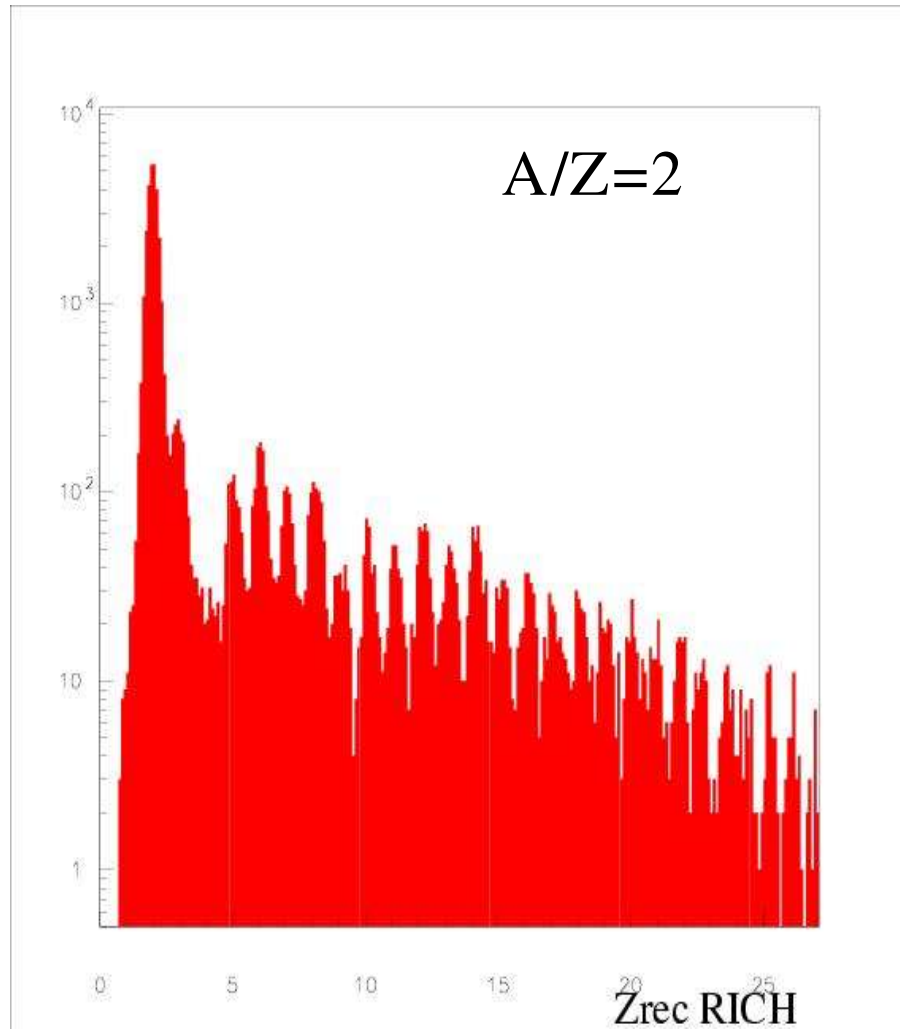
Fit function:

$$\sqrt{(a/Z)^2 + b^2}$$

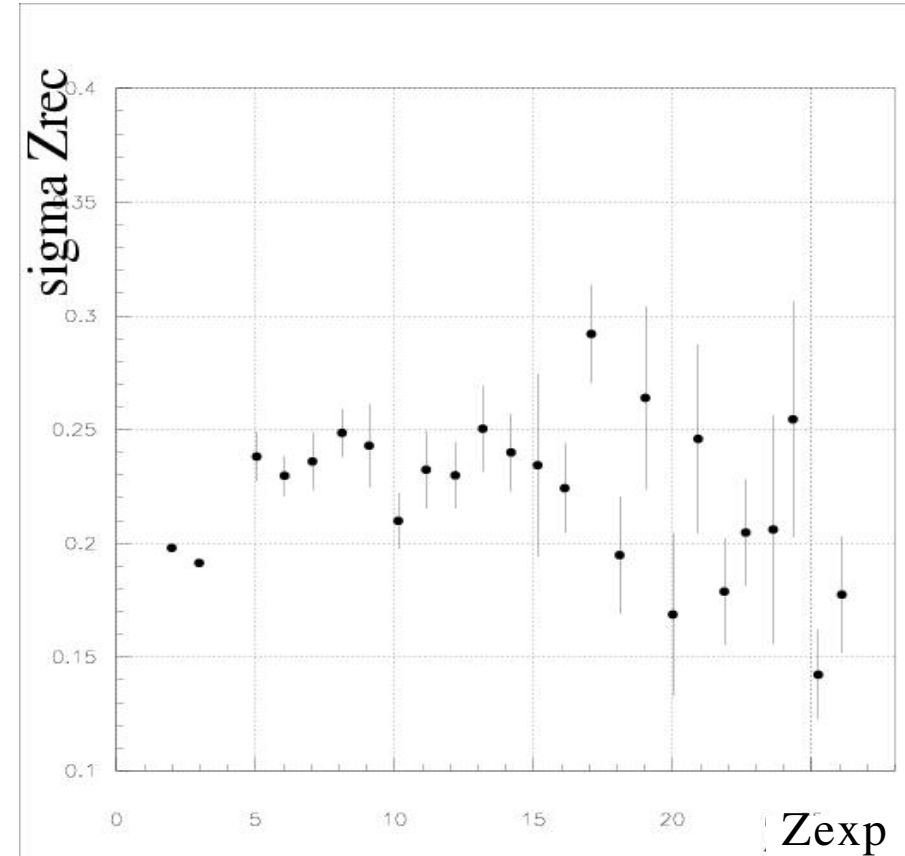
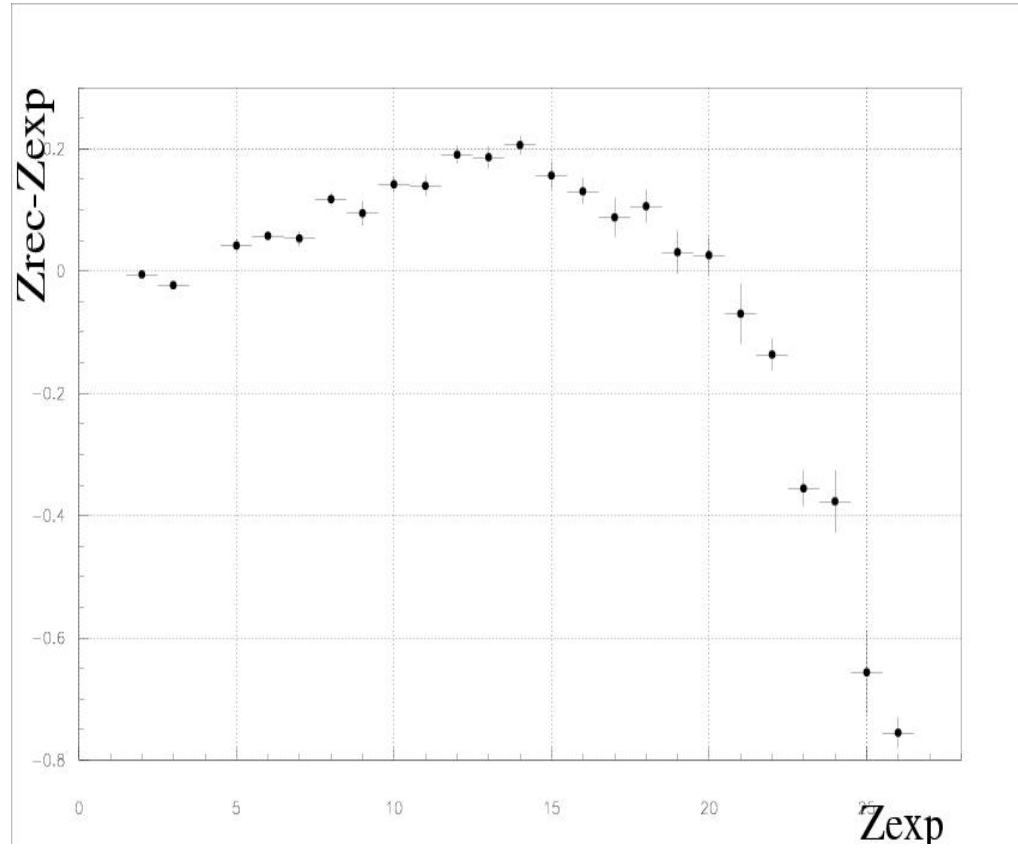
$$a=7.74\text{E-}4 \text{ +/- } 5.08\text{E-}6$$

$$b=7.28\text{E-}5 \text{ +/- } 1.65\text{E-}6$$

*Charge reconstruction: CIN1.03G (run 538) and CIN1.05 (run 607)*

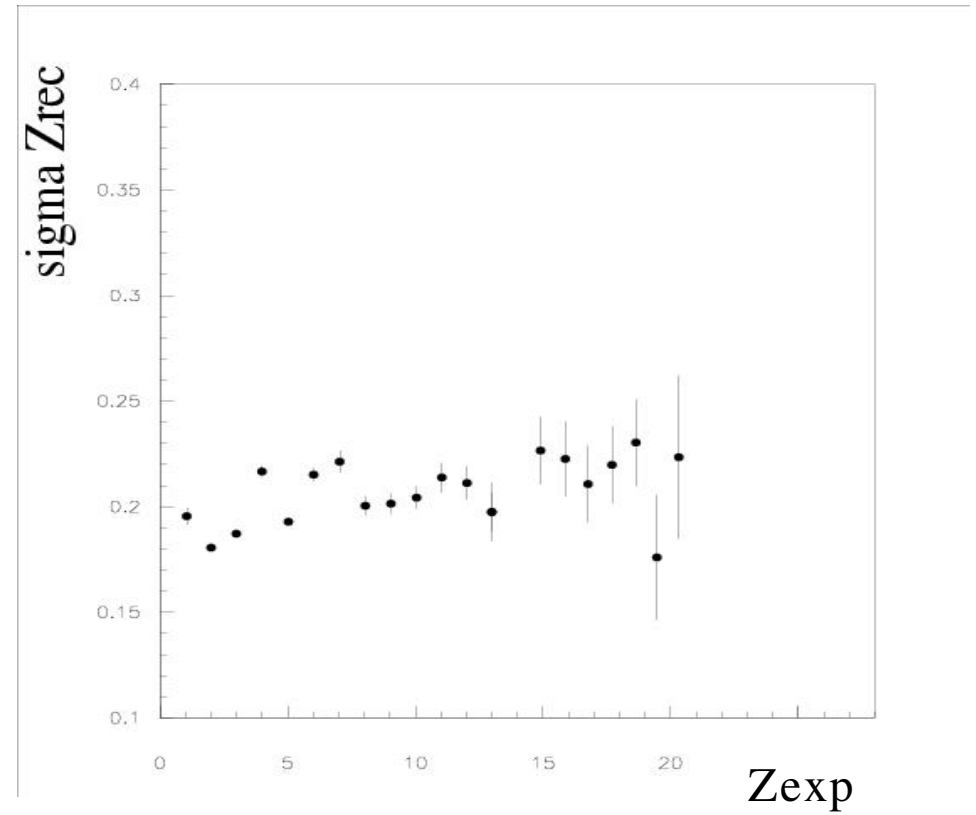
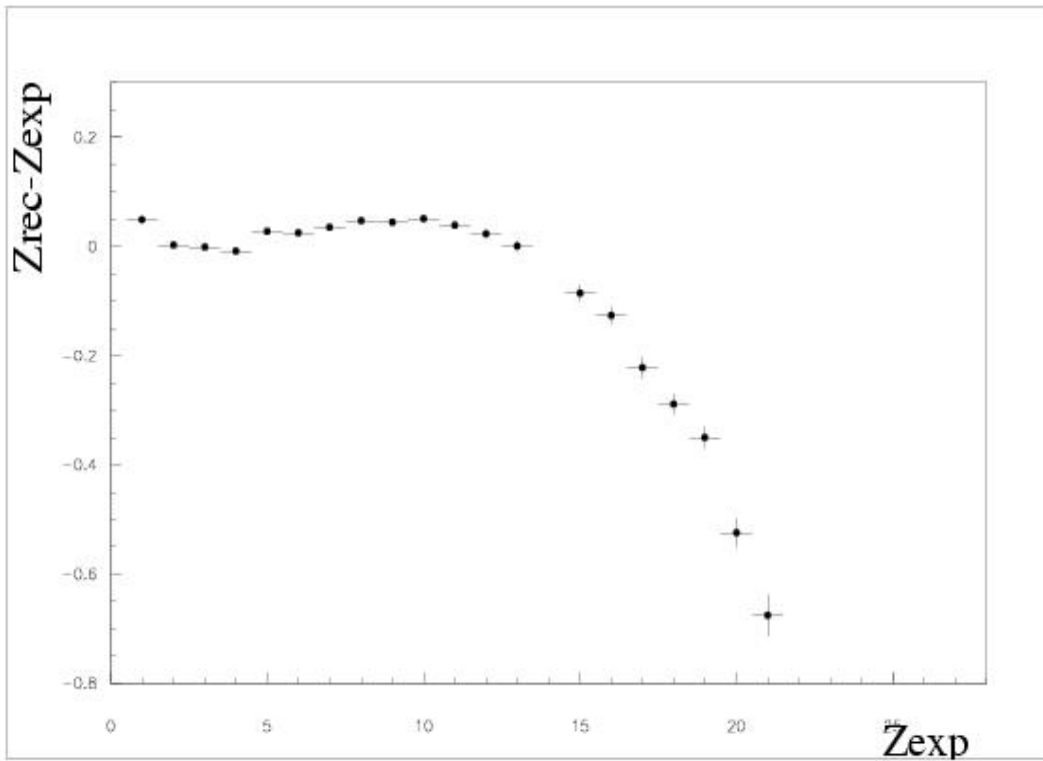


# Charge error and deviation CIN1.03G (run 538)

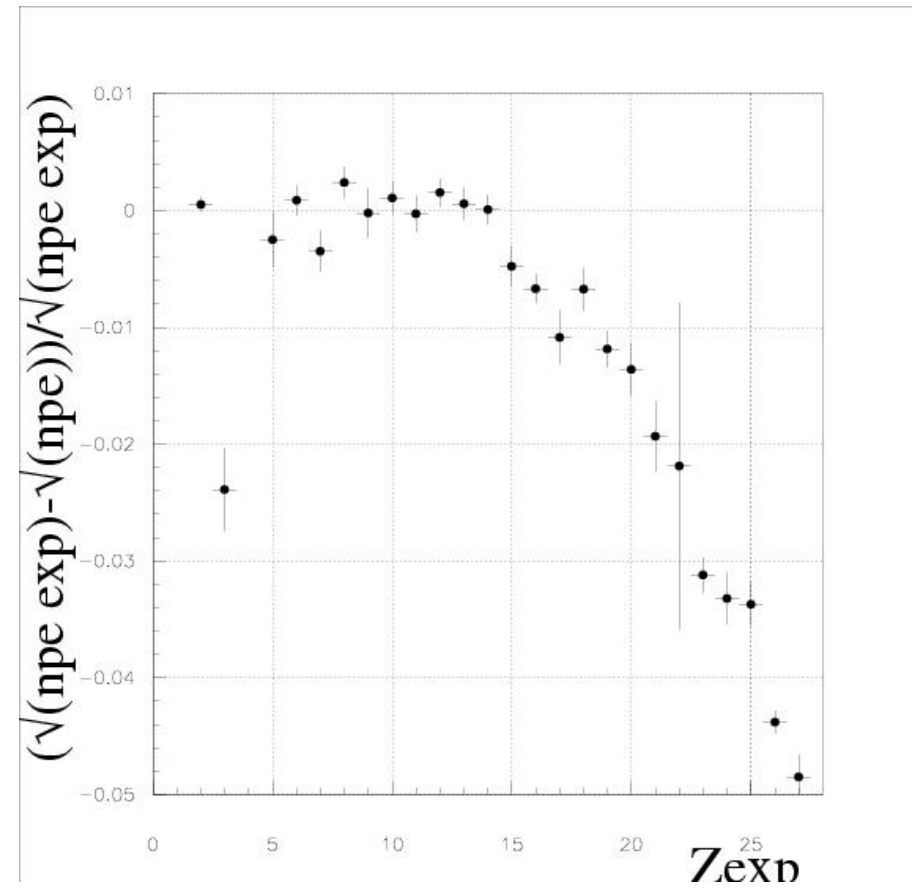
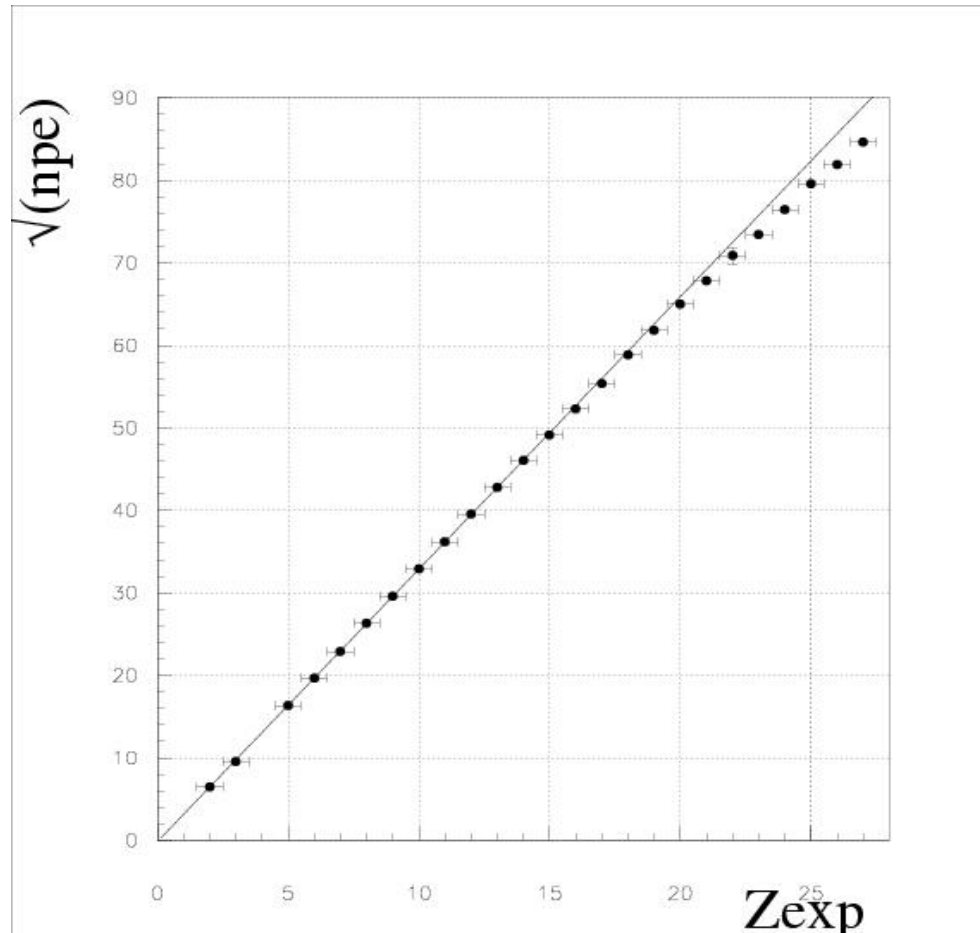




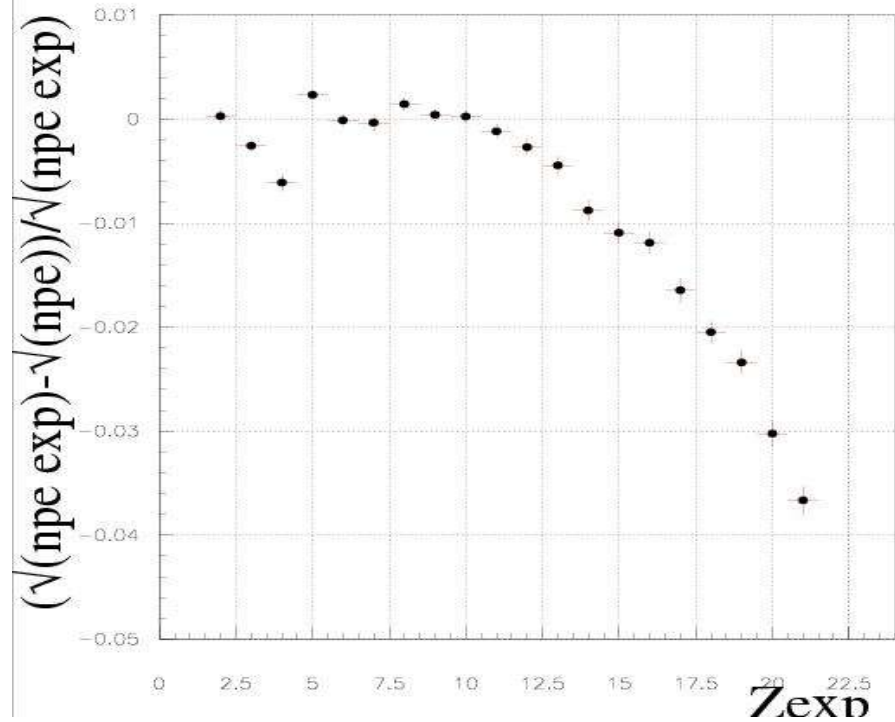
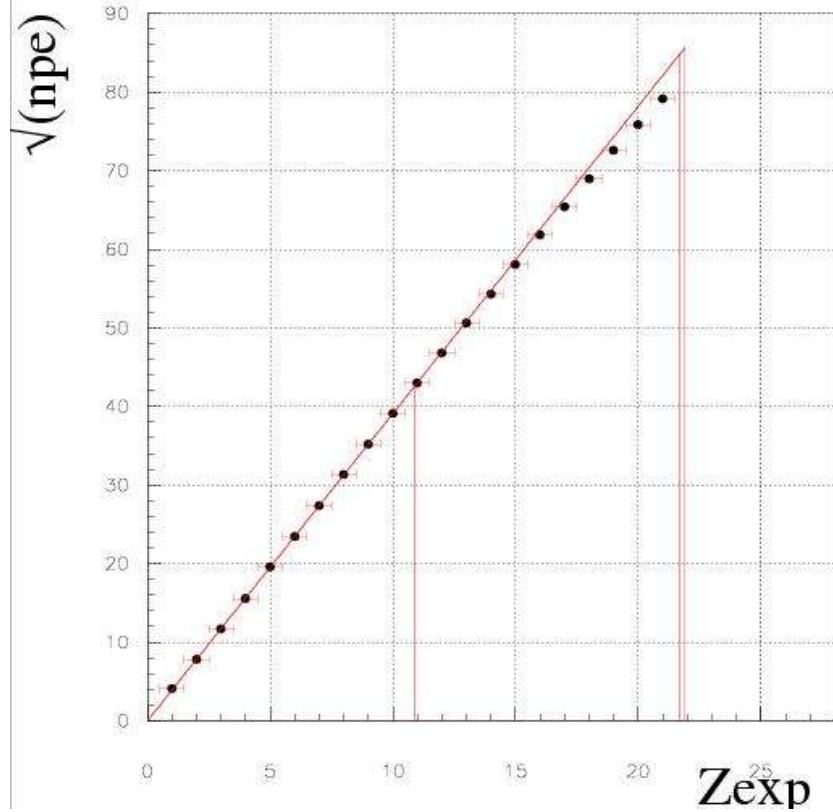
# Charge error and deviation CIN1.05 (run 607)



# *Nb Photoelectrons analysis CIN1.03 (run 538)*



# *Nb Photoelectrons analysis CIN1.05 (run 607)*



## *Conclusions:*

- ✓ Charge and velocity reconstruction performed for two CIN radiators (1.03/1.05)
- ✓ Saturation observed for  $Z > \sim 15$