# Test Beam 2003
# On going analysis of the runs
# with mirror

## LIP (Lisbon)

| Mirror analysis | | | | | |
|---|---|---|---|---|---|
| Run nb | A/Z | radiator | Expansion volume (cm) | Theta (°) | Mirror distance (cm) |
| 575 | 2 | N.105 | 43.2 | 15 | 15.5 |
| 579 | 2 | MN.105 | 43.2 | 20 | 10.0 |
| 580 | 2 | MN.105 | 37.3 | 20 | 10.0 |
| 581 | 2 | MN.105 | 37.3 | 15 | 10.0 |
| 583 | 2 | MN.105 | 37.3 | 10 | 10.1 |
| 584 | 2 | MN.105 | 37.3 | 0 | 10.1 |
| 585 | 2 | MNN.103 | 43.2 | 0 | 10.1 |
| 586 | 2 | MNN.103 | 43.2 | 10 | 10.1 |
| 587 | 2 | MNN.103 | 43.2 | 20 | 10.2 |
| 589 | 2 | NaF | 7.8 | 5 | 10.1 |

# RICH Prototype with mirror



?nt radiators
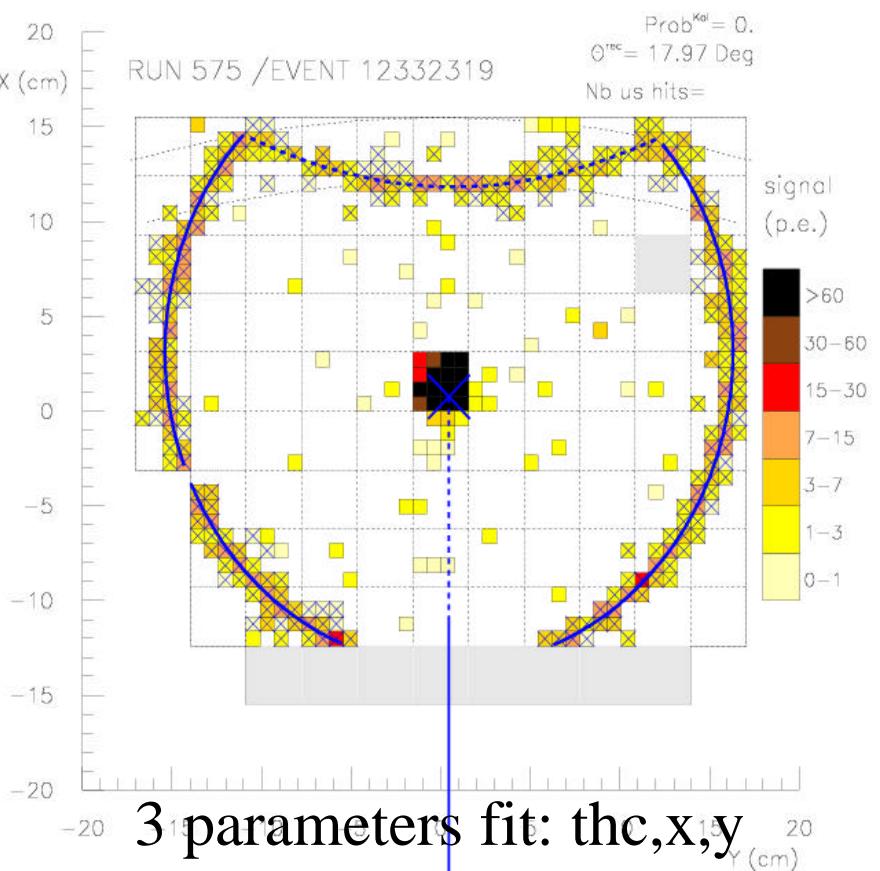
article

Z
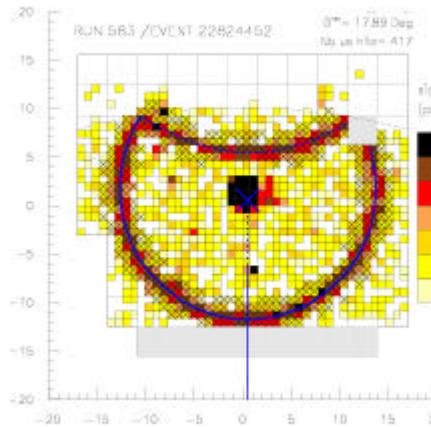
Run 575 N.105  Fluoride event



3 parameters fit: thc,x,y
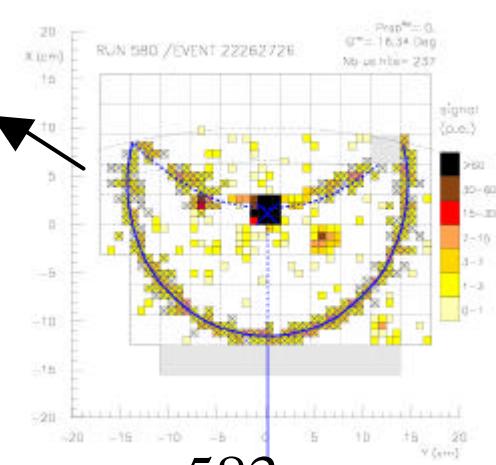
# Mirror coverage depends on the particle inclination

**583**
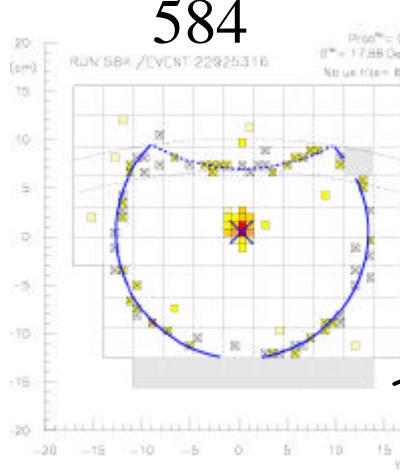
**Aerogel MN105**

**580**

**584**

**583**
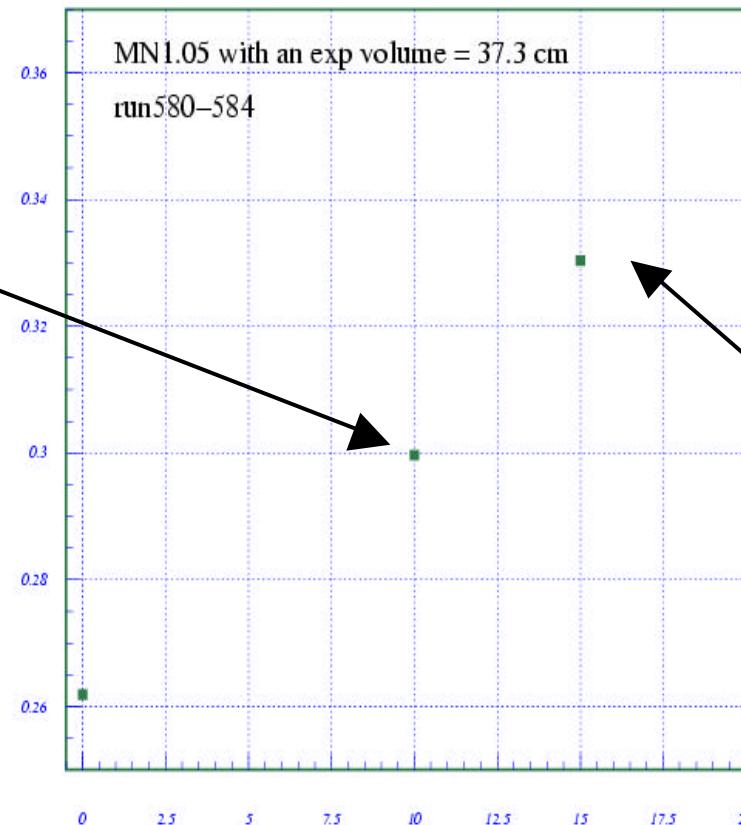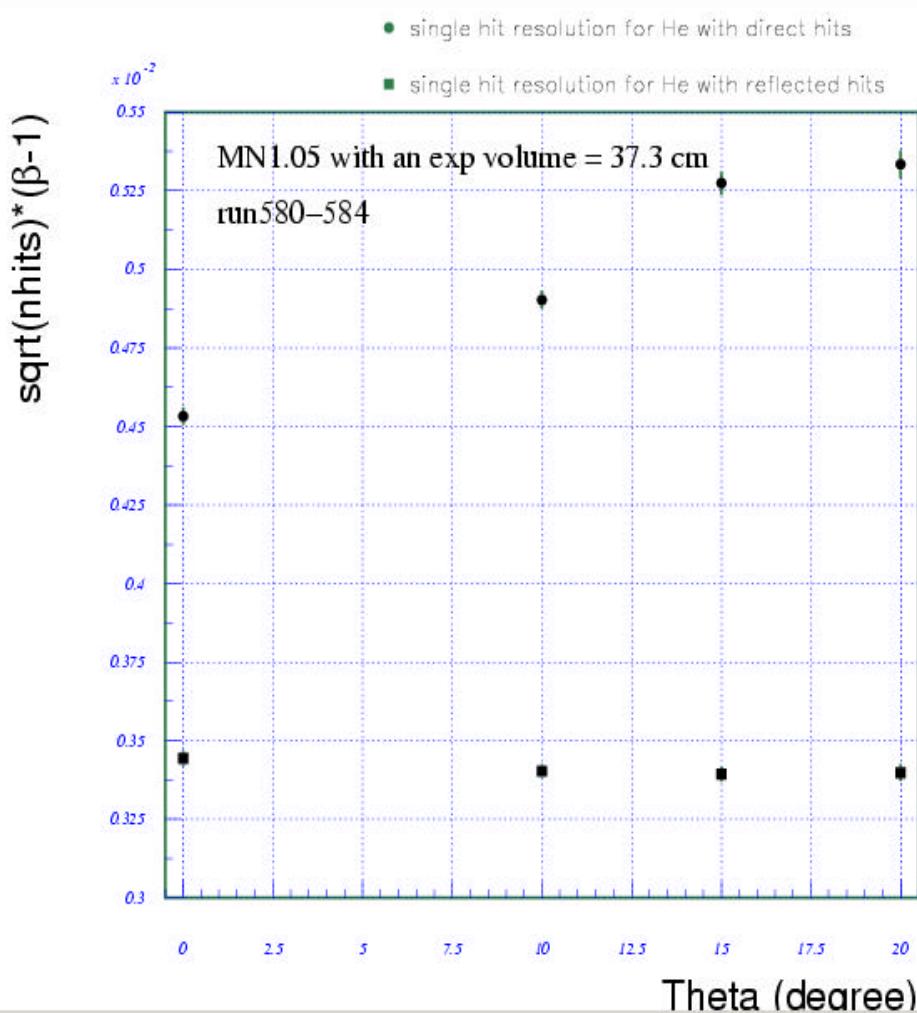


MN1.05 with an exp volume = 37.3 cm

run580–584

Theta (degree)

accmir

# Single hit resolution
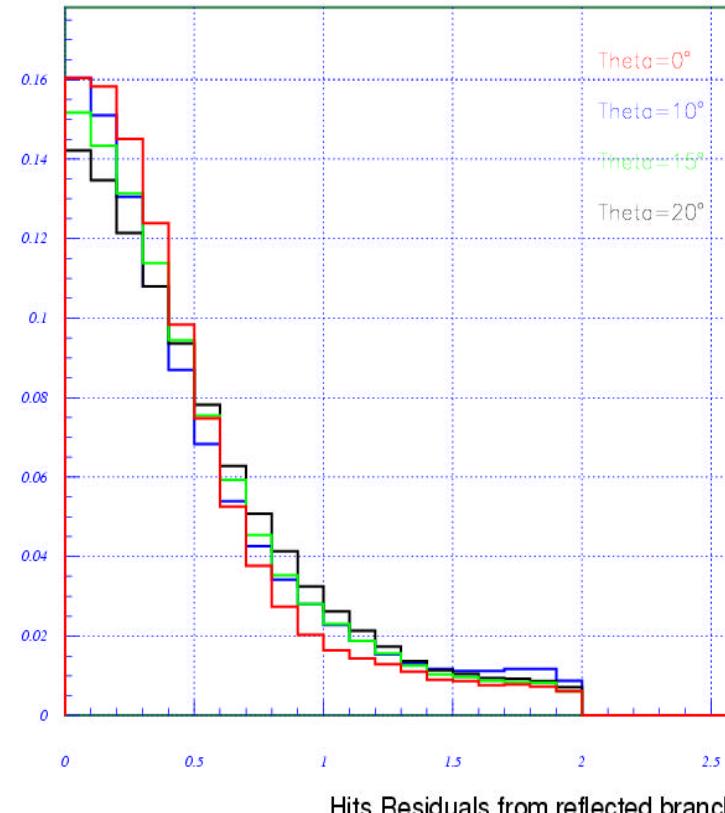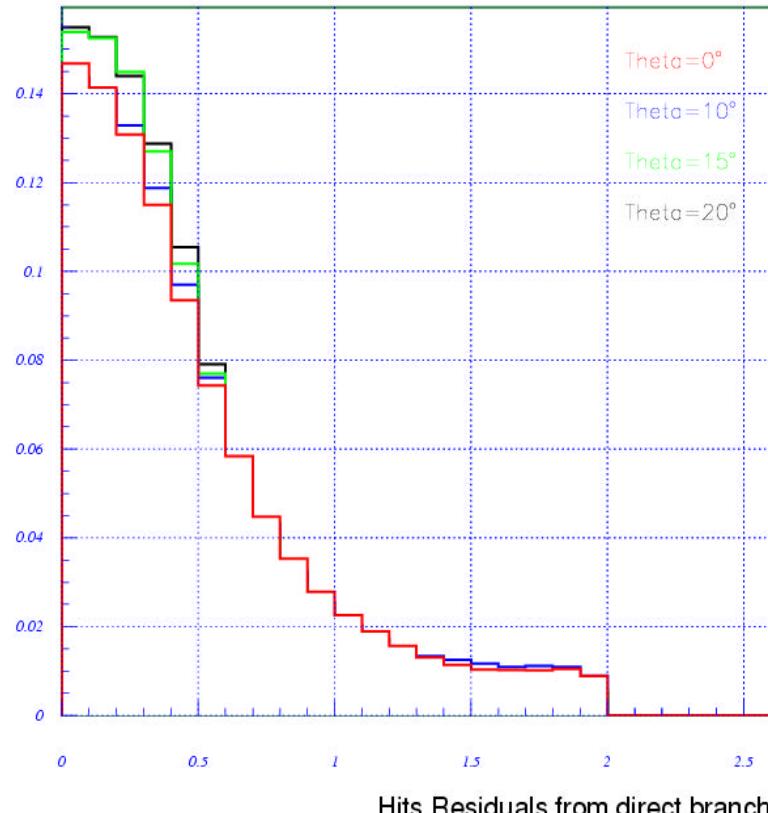


? Aerogel MN1.05

? Evaluated with reflected and direct hits

# Hit residuals distribution
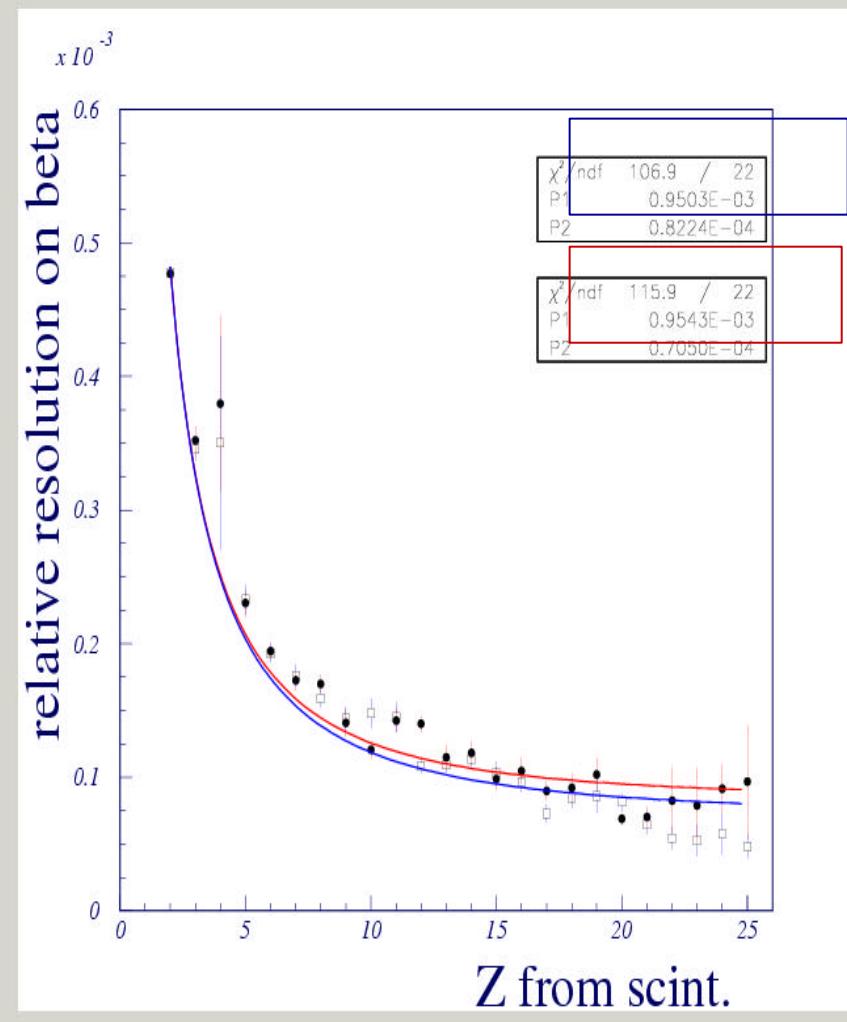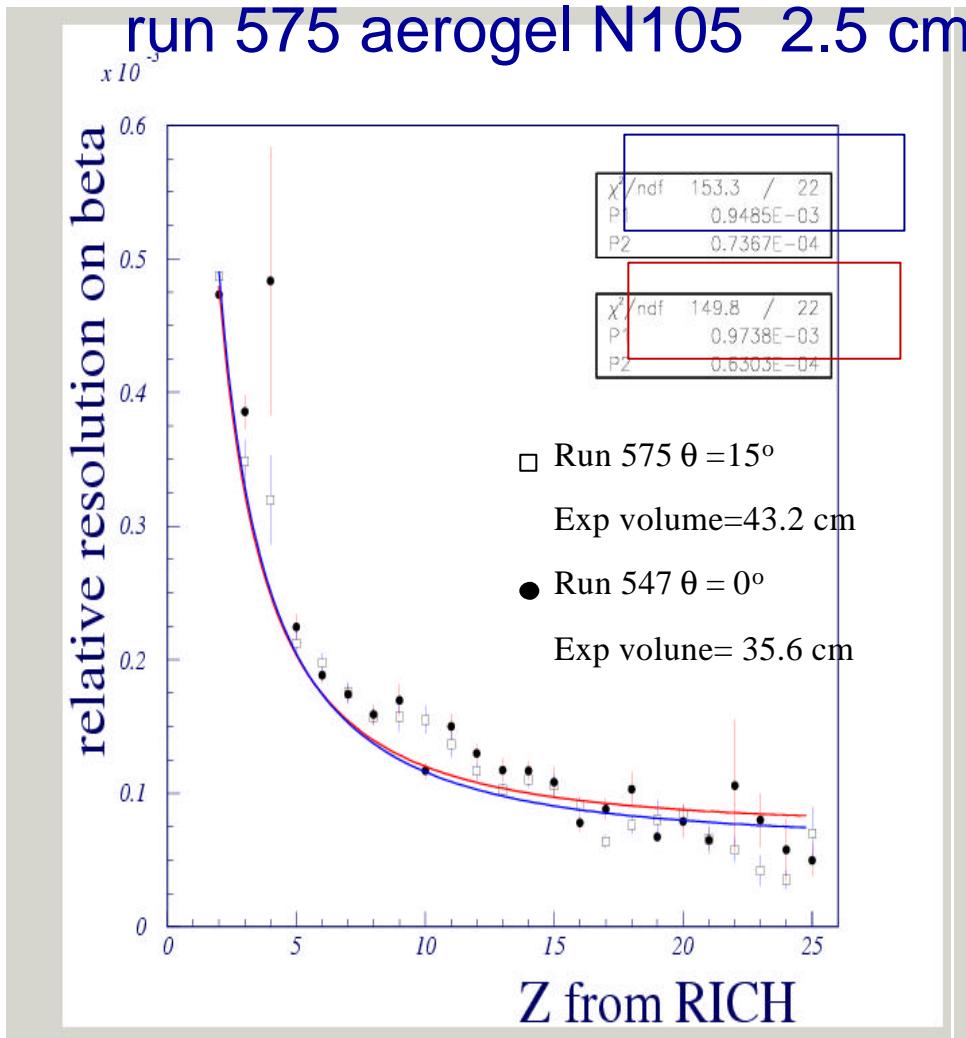
## Aerogel MN105

# Relative resolution on beta



run 575 aerogel N105  2.5 cm
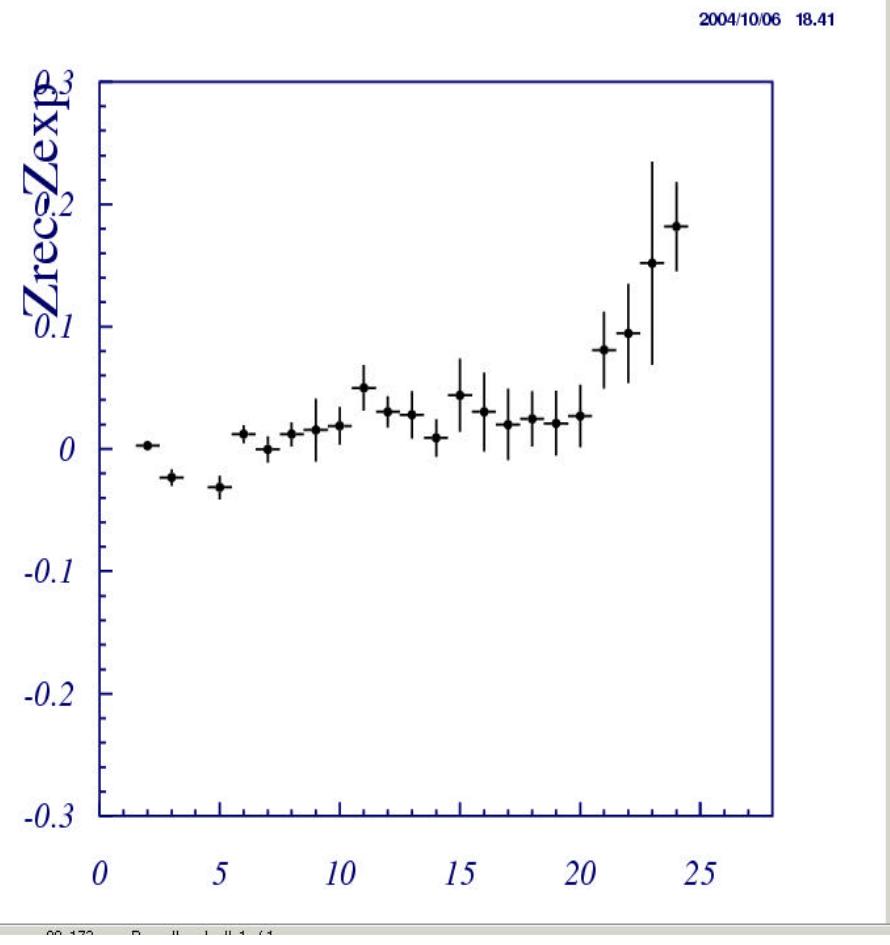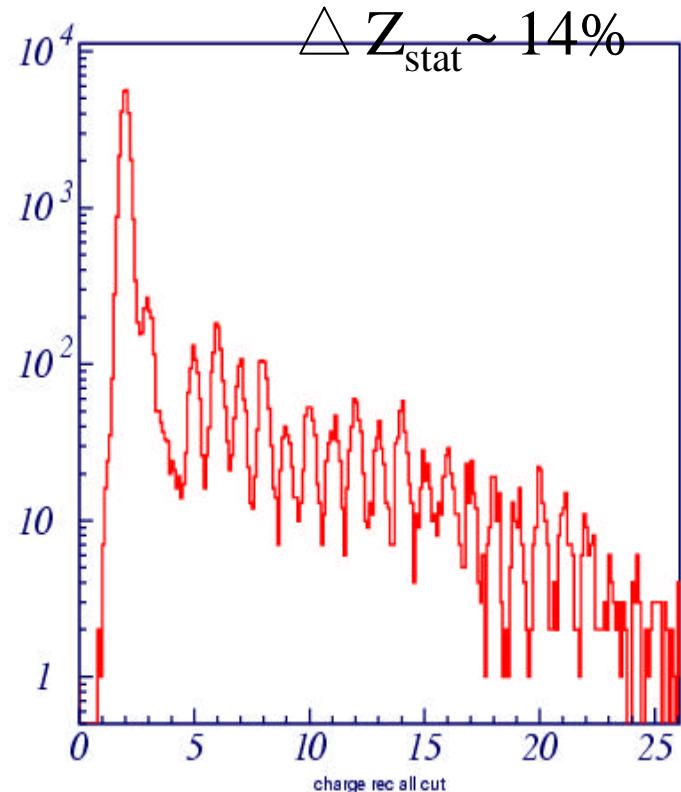
# Charge Reconstruction
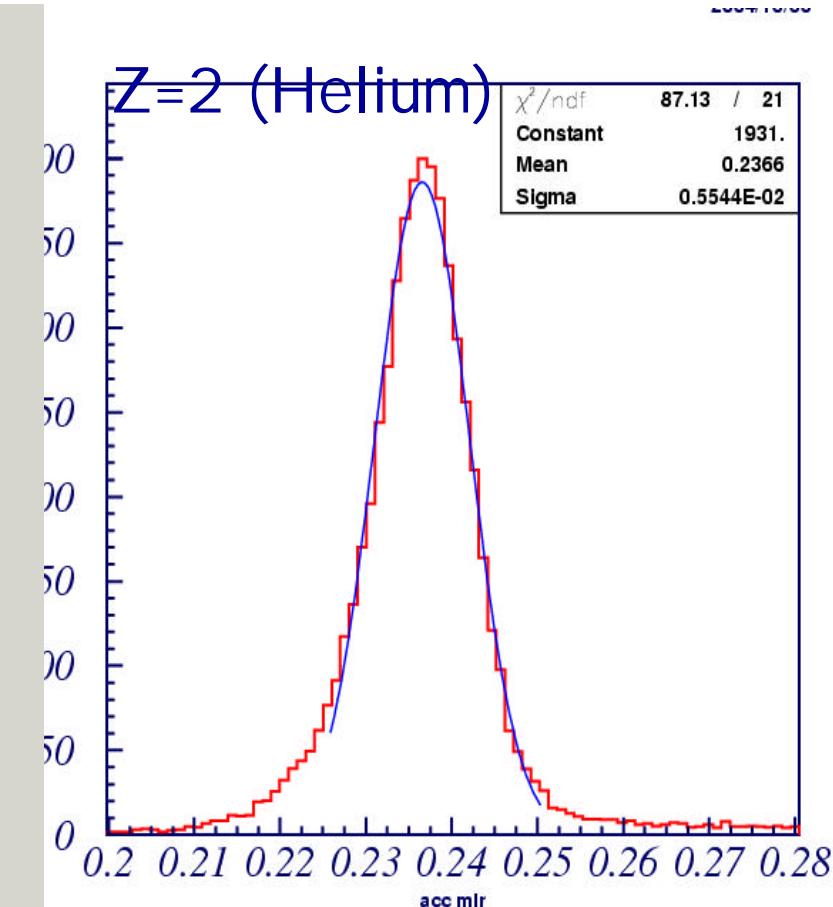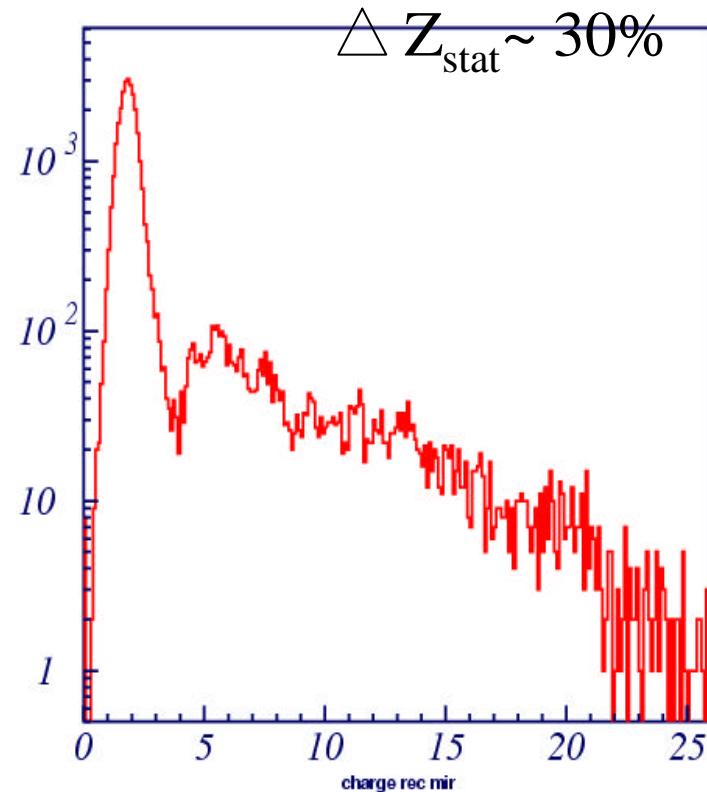
# Z rec for run 575 A/Z=2

Aerogel N1.05

$\triangle Z_{stat} \sim 14\%$

# Z rec with only the reflected branch

Acc mirror=23.7%

$\triangle Z_{stat} \sim 30\%$

Z=2 (Helium)

| | |
|---|---|
| $\chi^2$/ndf | 87.13 / 21 |
| Constant | 1931. |
| Mean | 0.2366 |
| Sigma | 0.5544E-02 |

charge rec mir

acc mir
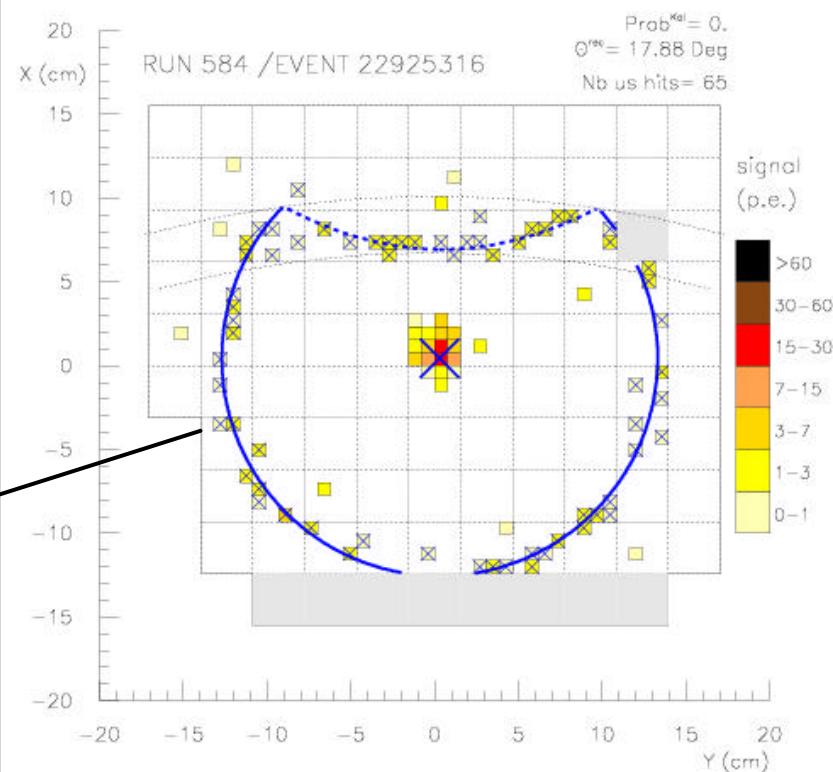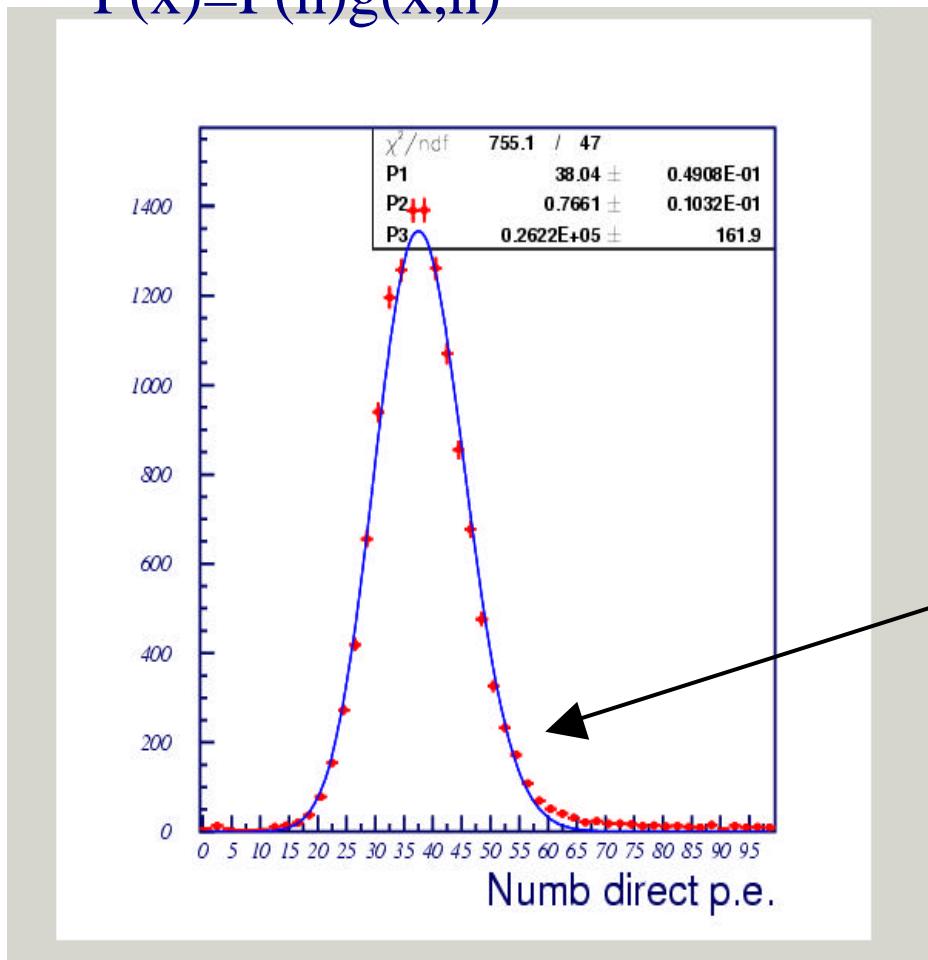
# Mirror reflectivity evaluation
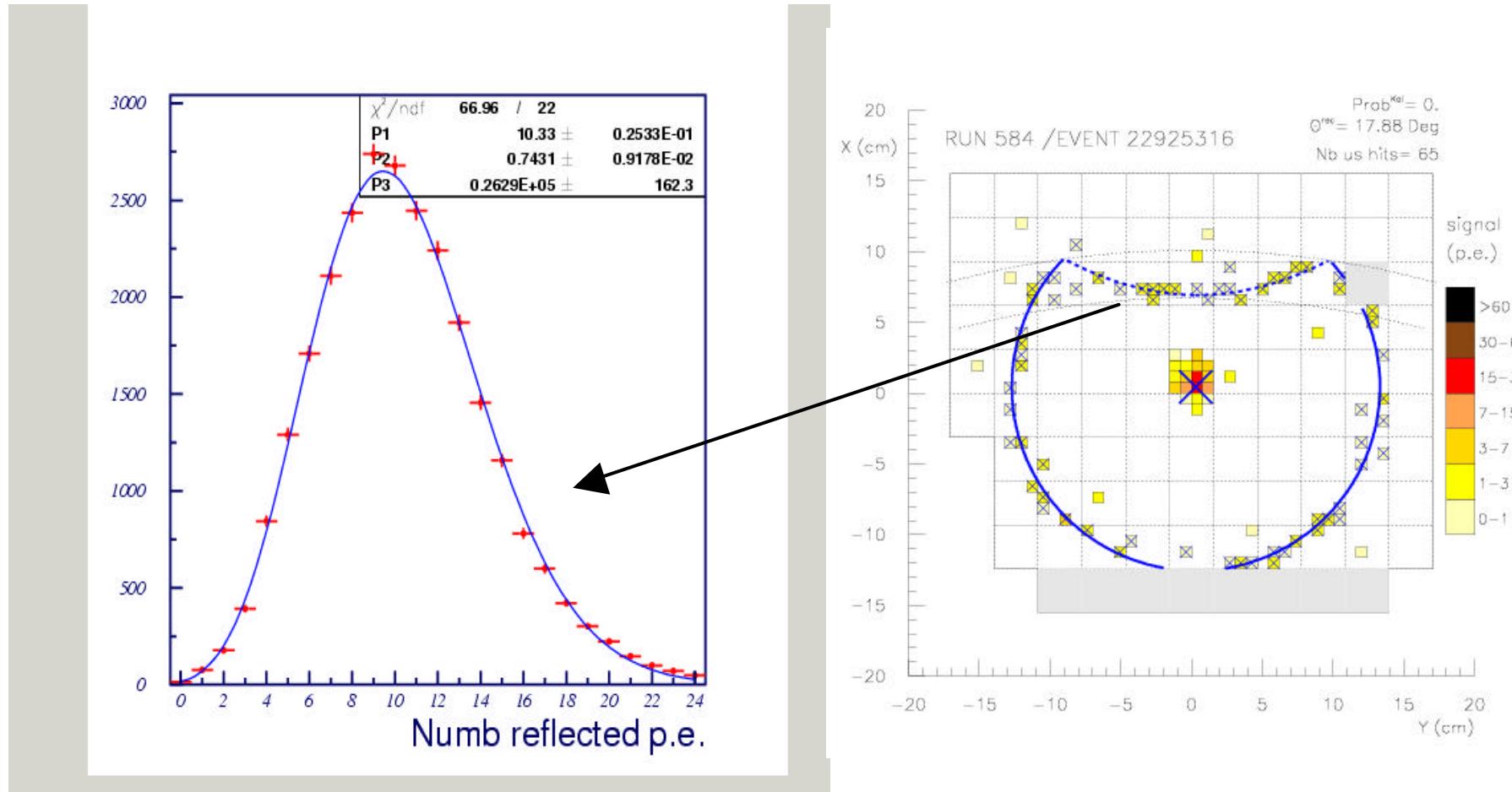
# Light Yield: Helium events (Z=2) selected

$F(x)=P(n)g(x,n)$



Direct photons: < Npe > =38.04+/-0.05

# Light Yield: Helium events (Z=2) selected



Reflected photons: < Npe > =10.33+/-0.03
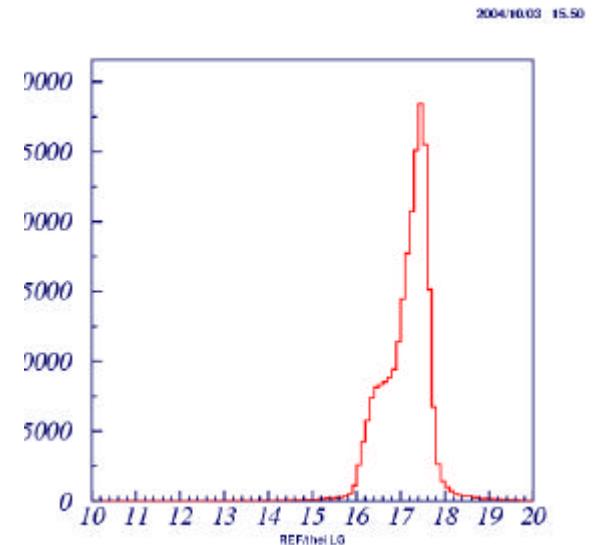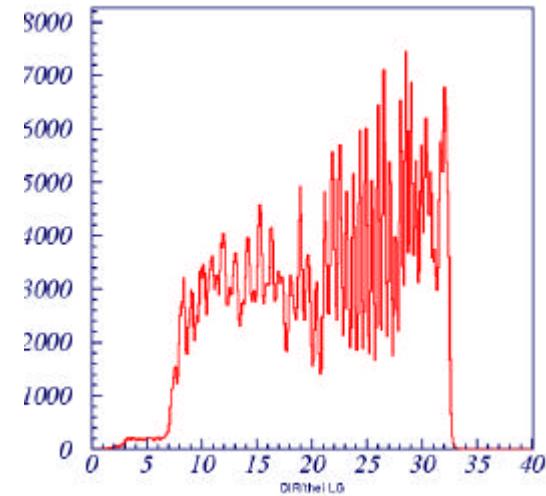
# Reflectivity evaluation

$$\varepsilon_{mir} = \frac{N_{pe}^{ref}}{N_{pe}^{dir}} \frac{\varepsilon_{geo}^{dir}}{\varepsilon_{geo}^{ref}} \frac{\varepsilon_{lg}^{dir}}{\varepsilon_{lg}^{ref}}$$

| Run 575 | Direct | Reflected |
|---|---|---|
| $N_{pe}$ | 38.04 | 10.33 |
| eff Lg | 0.710 | 0.765 |
| eff geom | 0.62 | 0.24 |
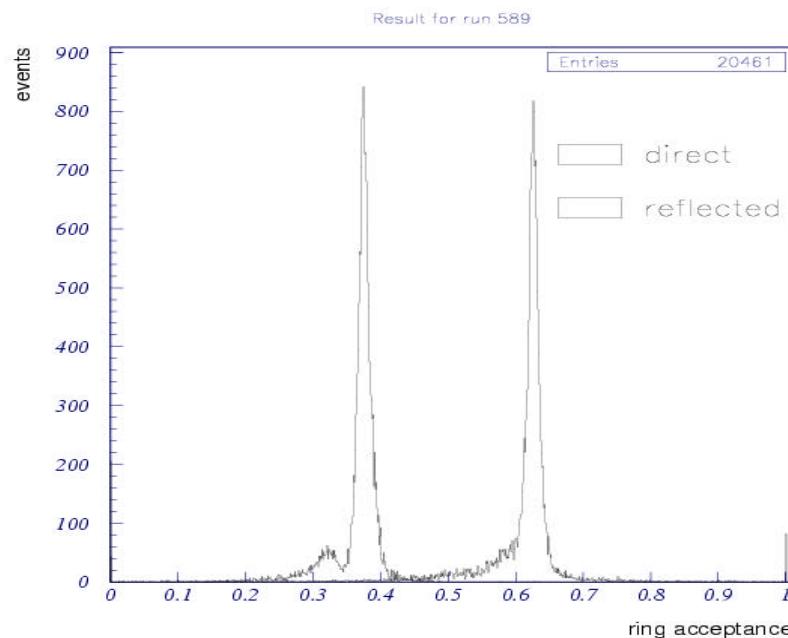
Reflectivity ~ 66%
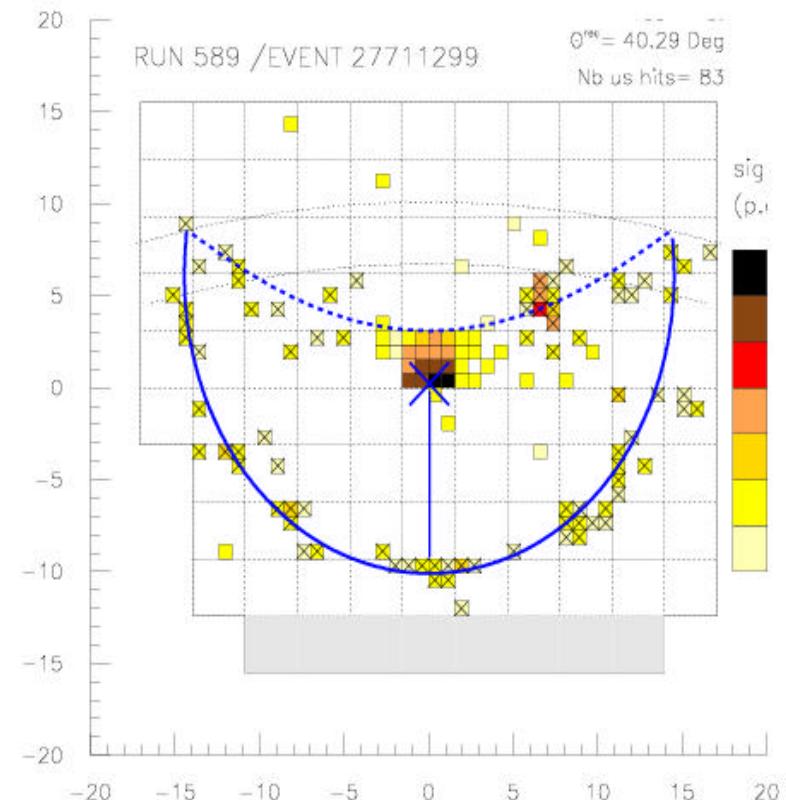
# NaF analysis

# Run 589 NaF θ=10°
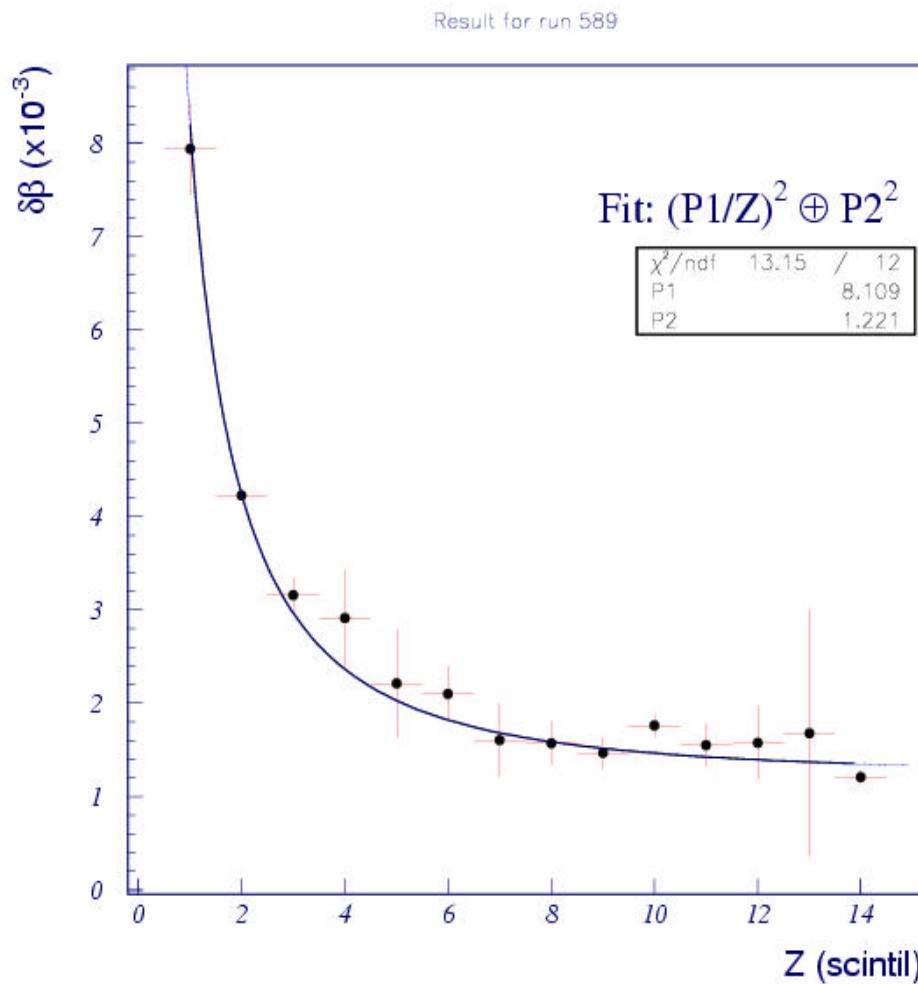


## Geometrical ring acceptance:

? Direct ~62%

? Reflected ~37%

# Velocity resolution

Result for run 589



Fit: $(P1/Z)^2 \oplus P2^2$

$\chi^2/ndf$    13.15    /    12
P1                      8.109
P2                      1.221

NaF radiator 0.5 cm

run 589

$\theta = 10^\circ$

## Resolution
(Z=1) ~$8.1 \times 10^{-3}$
(Z>>) ~ $1.2 \times 10^{-3}$

# Conclusions

- Analysis of the mirror runs started
- Beta reconstruction made with a 3 parameters fit for inclined particles
- No visible degradation on reconstructions with reflected hits
- A first evaluation on the mirror reflectivity was done and need to be improved and cross checked with other runs
- NaF runs started to be analyzed