

First look on TOF alignment

1. release 4.6.2
2. GeometryModel set Aligned
3. ToFModule from development
(talk to from TOF home page)

First sample: all pt

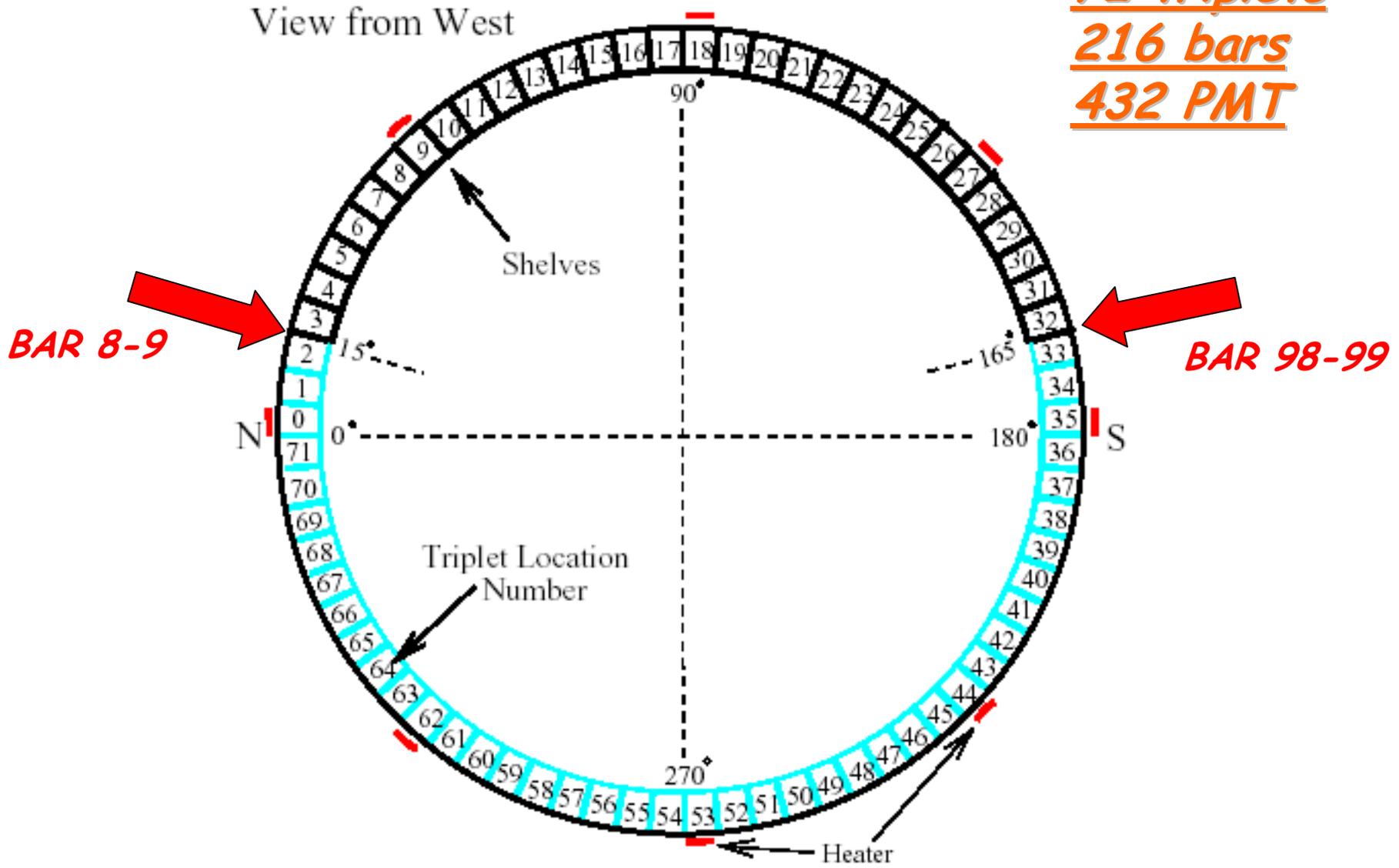
2d sample: $pt > 2 \text{ GeV}/c$

Used jbot4e, bhe101, bhmu01,... on CAF

Total: about 2163 K events

TOF numbering in triplets

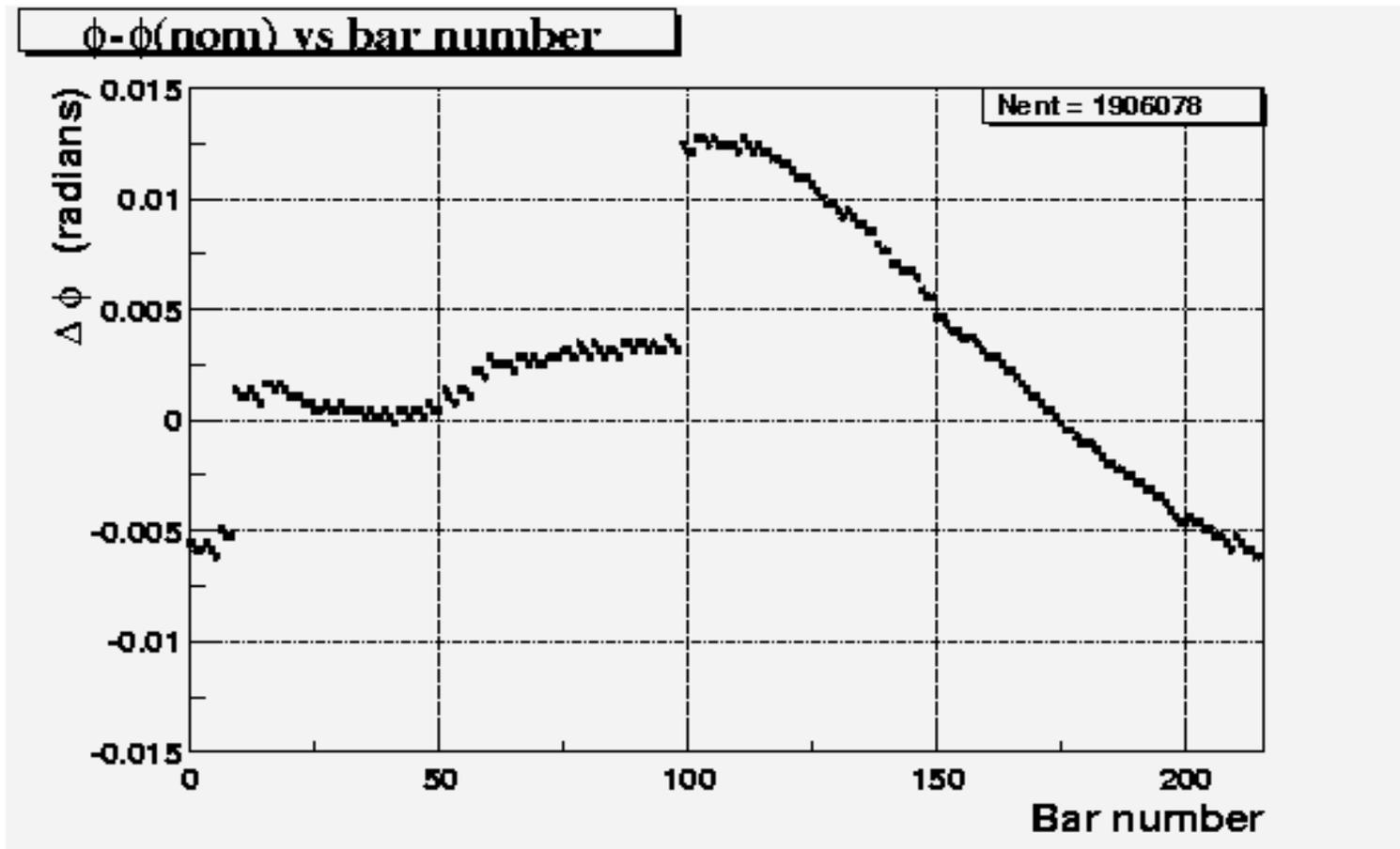
72 triplets
216 bars
432 PMT



Aligned geometry from DB

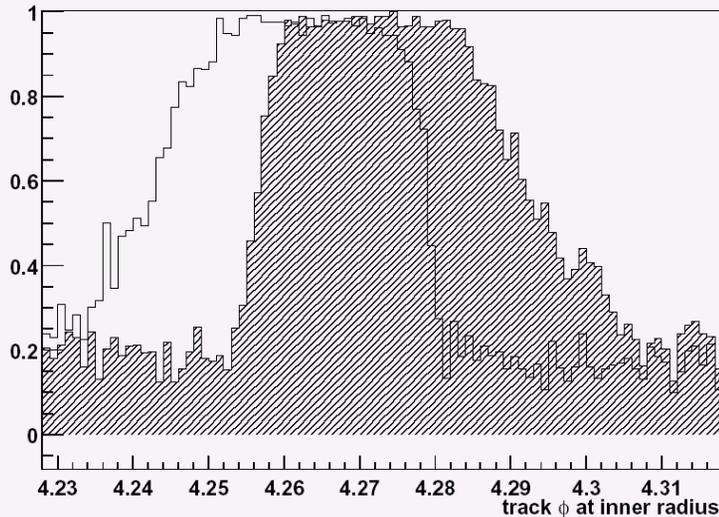
$$\Delta\phi = \phi_{nom} - \phi_i$$

$$\phi_i = 2\pi \left(\frac{1}{2} + i \right) / 216$$



What was done...

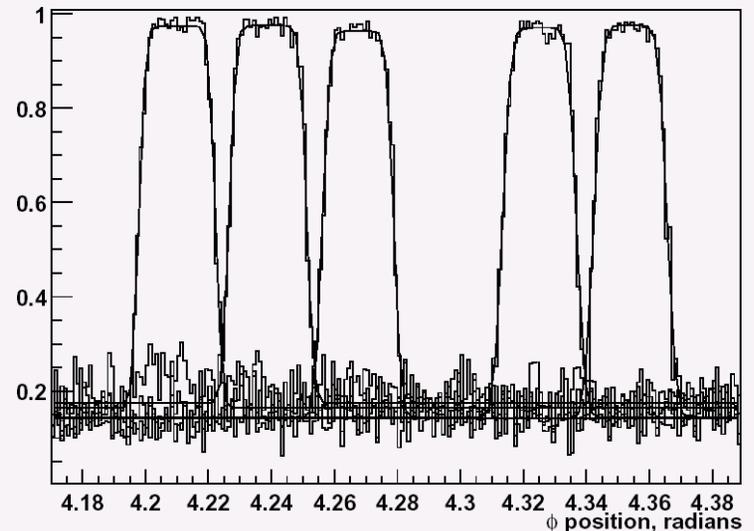
Relative fraction of tracks seen for bar 146



- *phi for positive tracks at an assumed R*
- *phi for negative & positive tracks*
- *the center of the bar is the averaged*

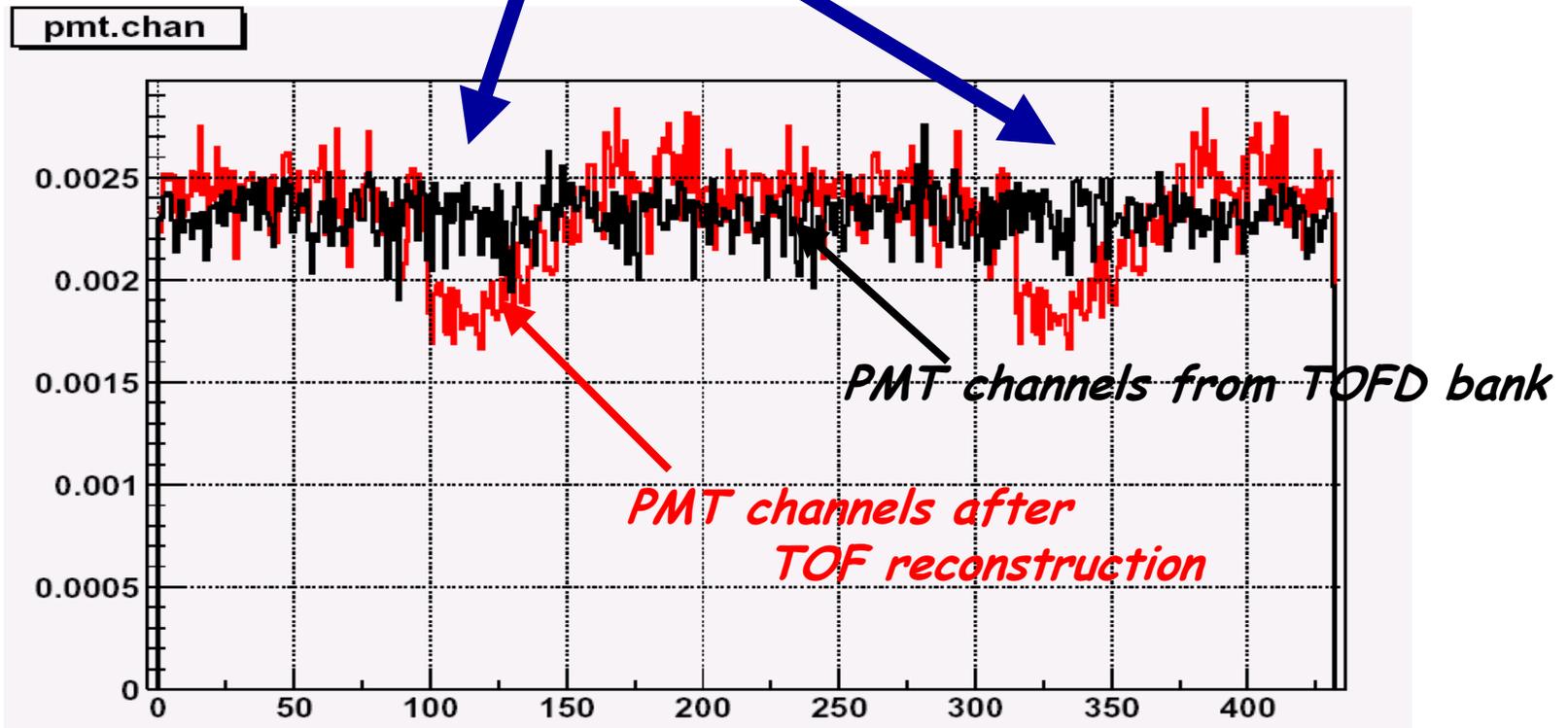
*Denis Usynin,
TOF minutes from June, 21 2001*

Bars at the east side



TOF mysteries

*"inefficient" channels 99-150
and 315 - 360 => bars 99 - 150*



Variables

$$2\pi/216 \sim 0.029 \text{ rad}$$

ϕ_{nom}

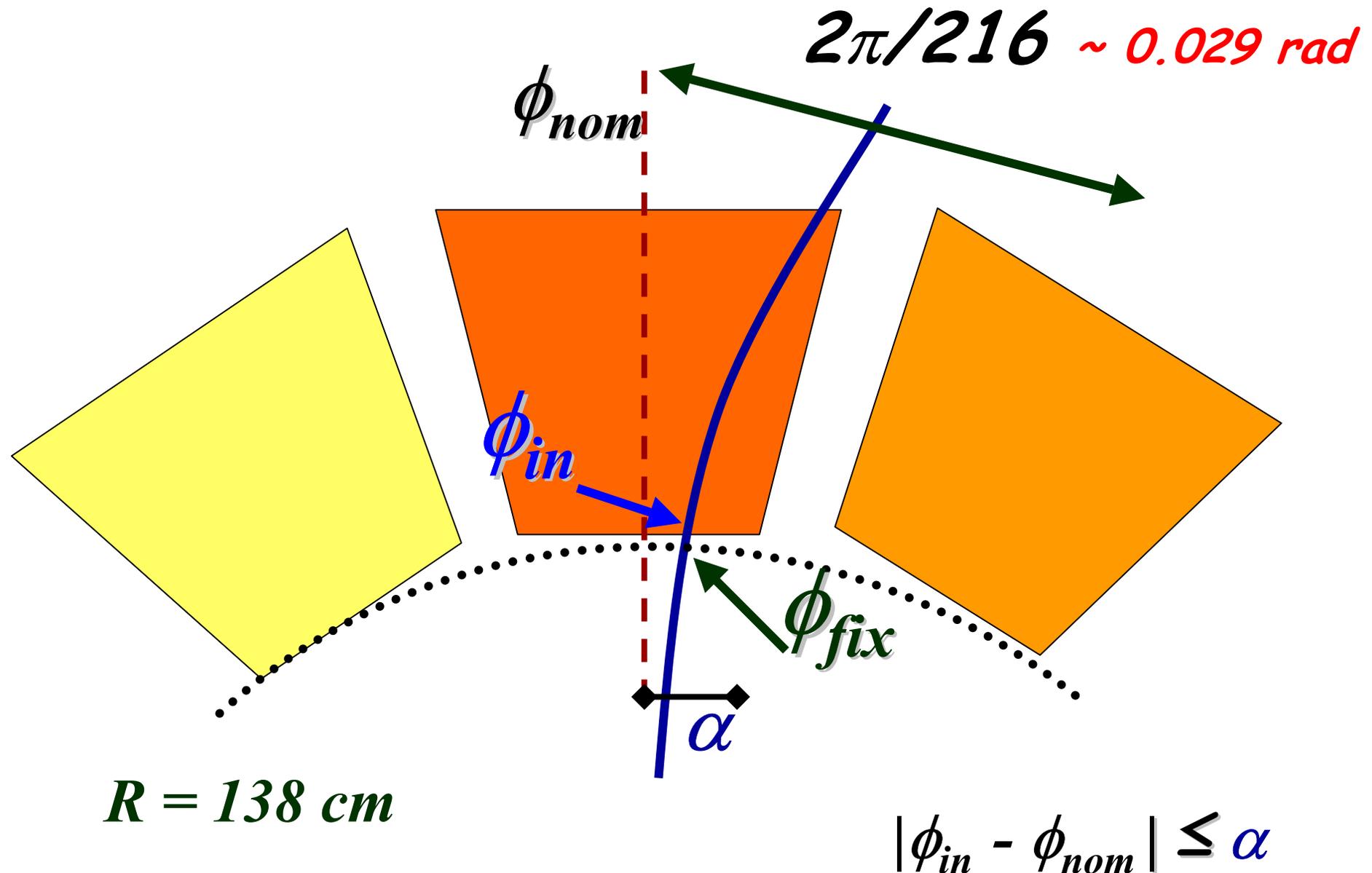
ϕ_{in}

ϕ_{fix}

α

$$R = 138 \text{ cm}$$

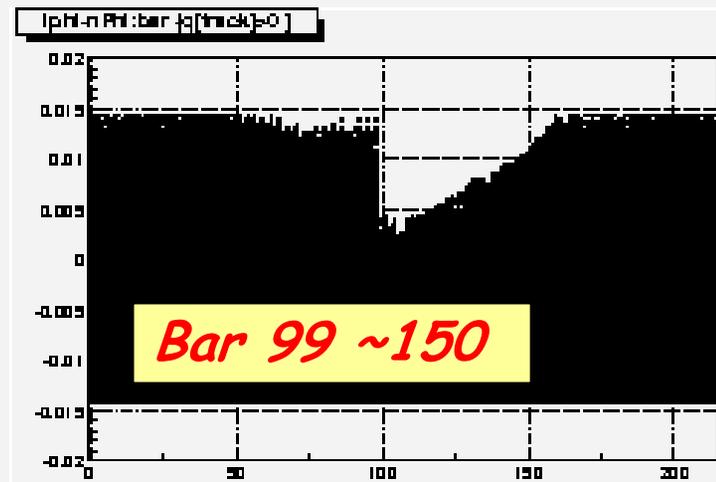
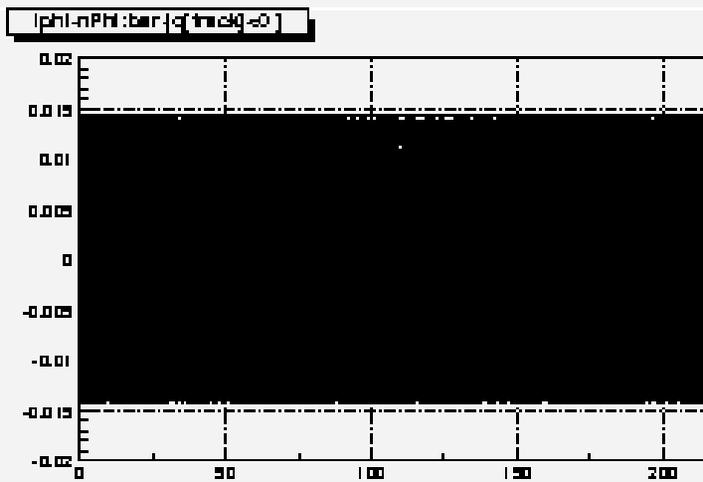
$$|\phi_{in} - \phi_{nom}| \leq \alpha$$



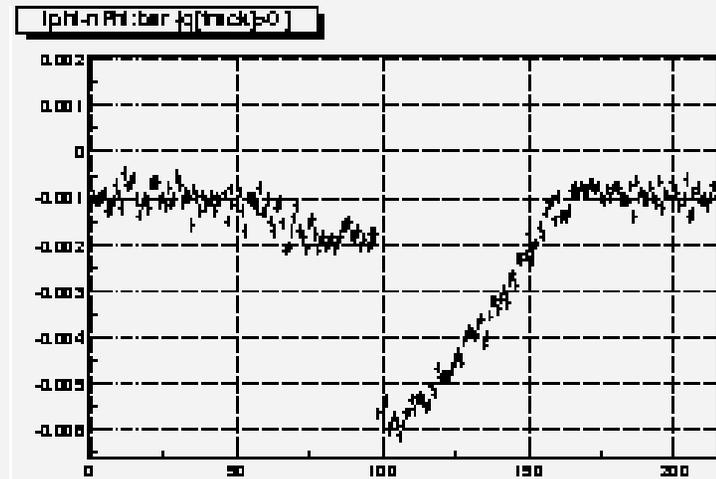
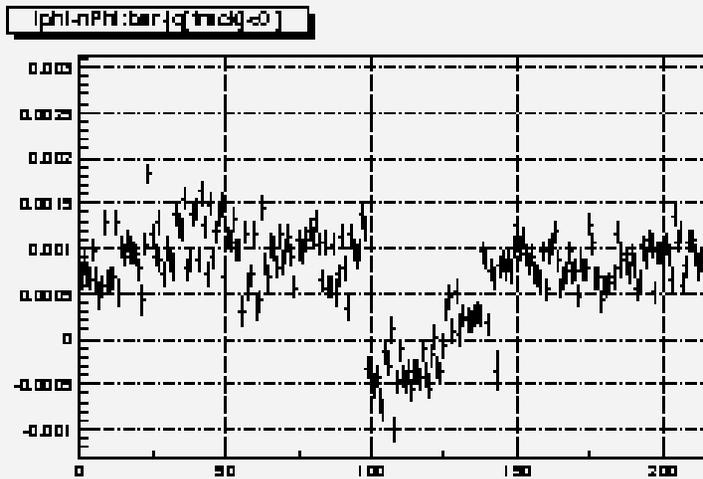
$(\phi_{in} - \phi_{nom})$ versus *Bar Number*

Negative tracks

Positive tracks



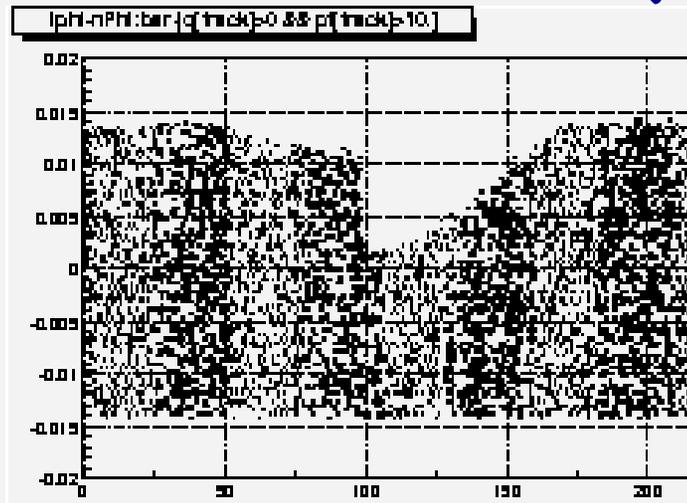
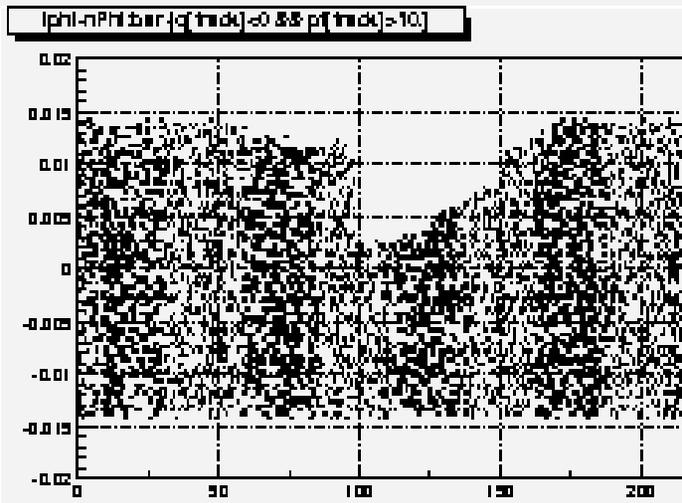
profile



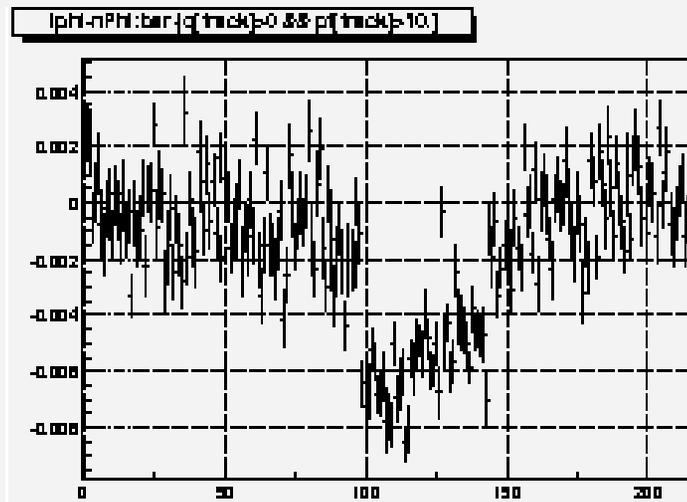
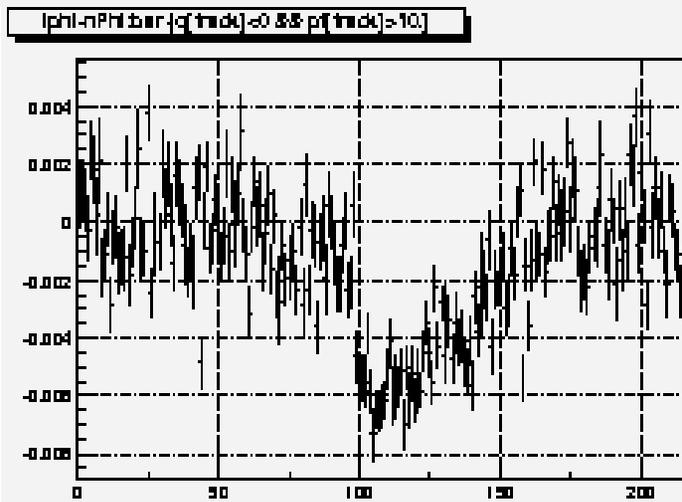
the same with $pt > 10 \text{ GeV}/c$

Q < 0

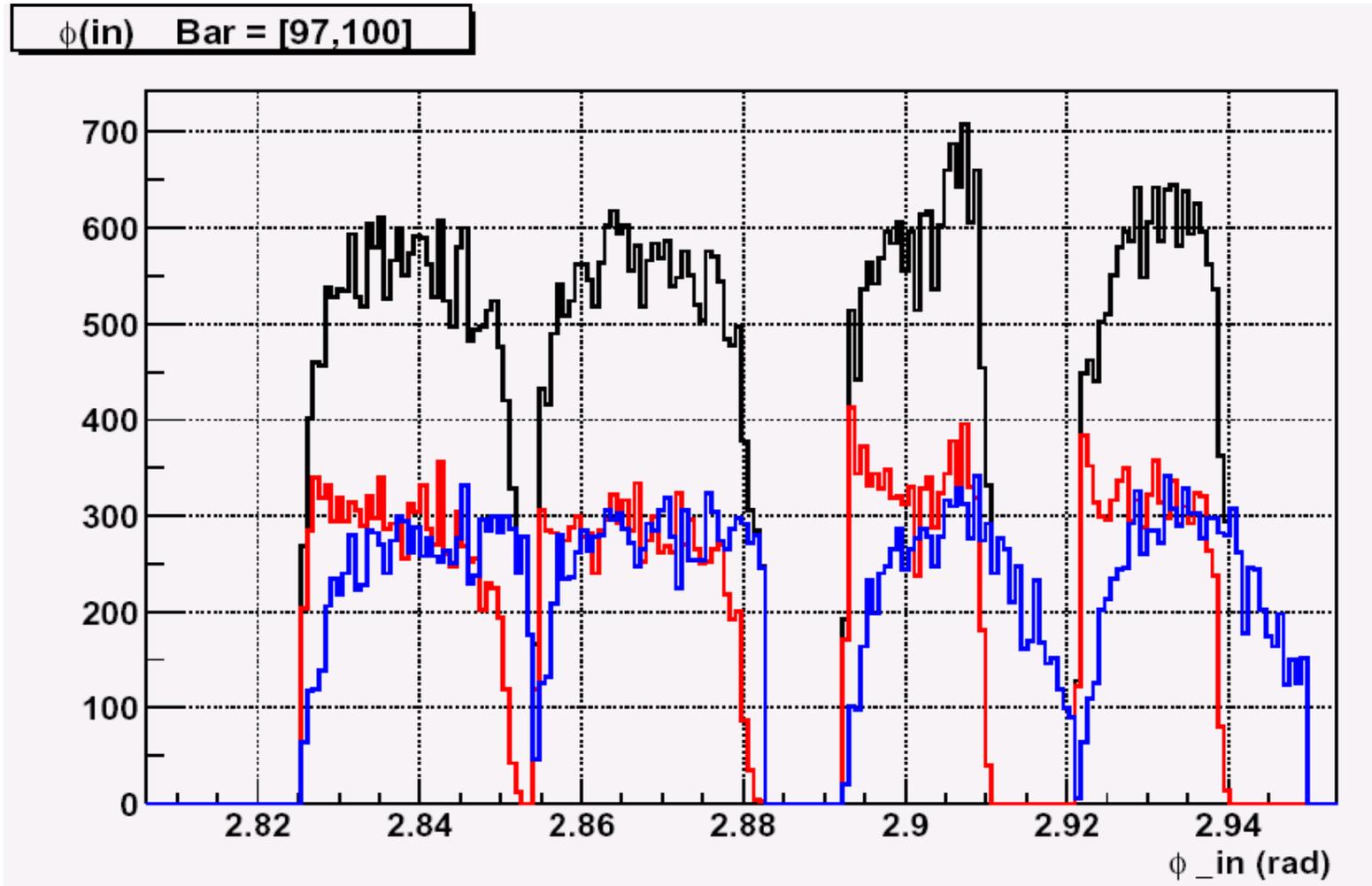
Q > 0

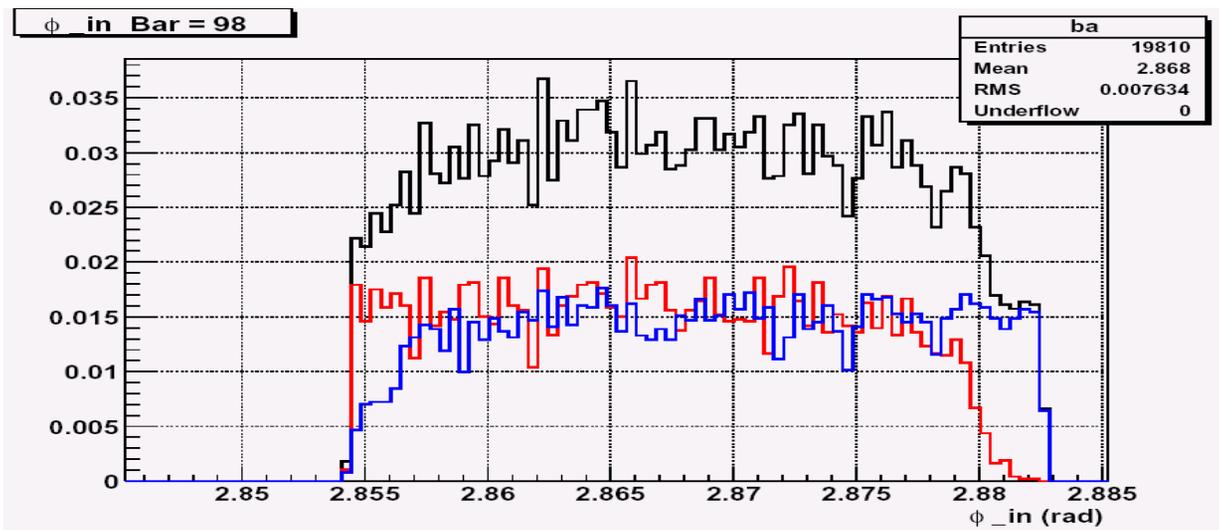


profile



ϕ_{in} for bars 97-100

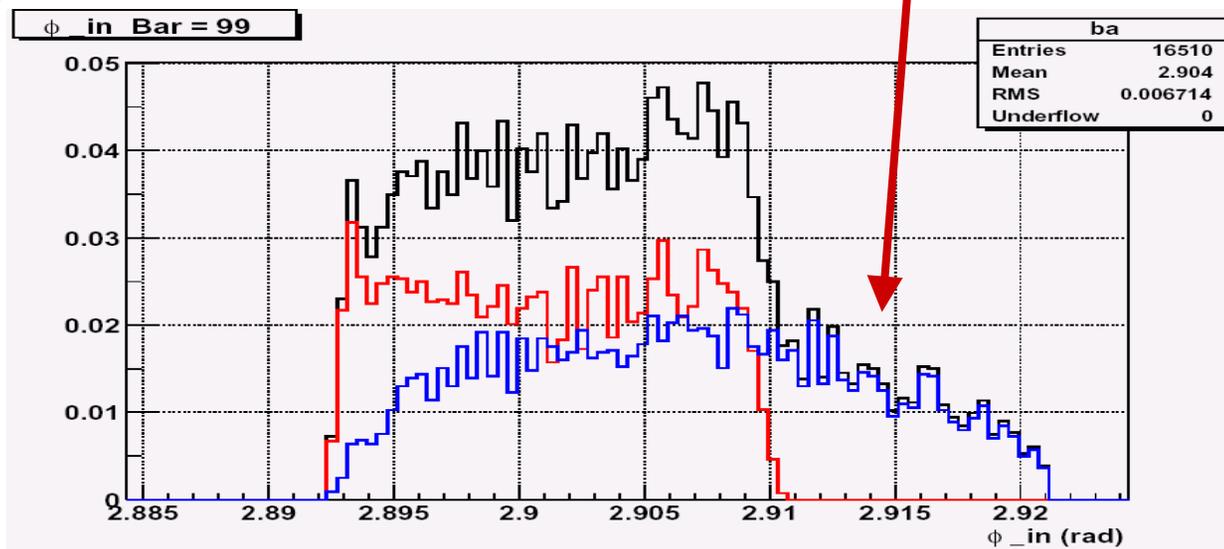
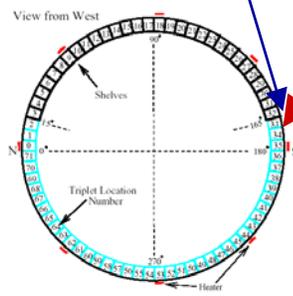




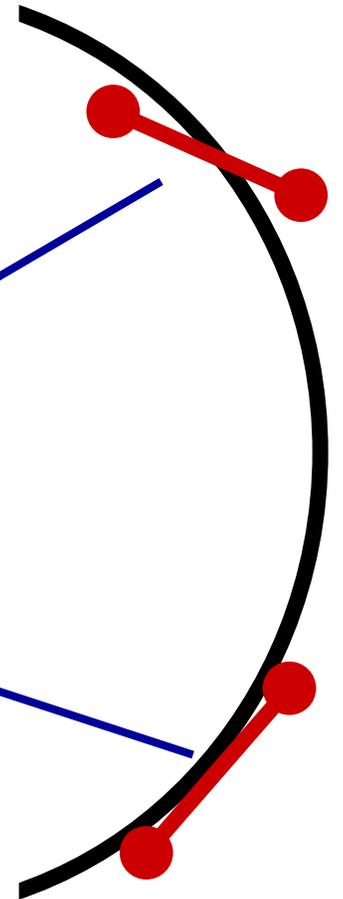
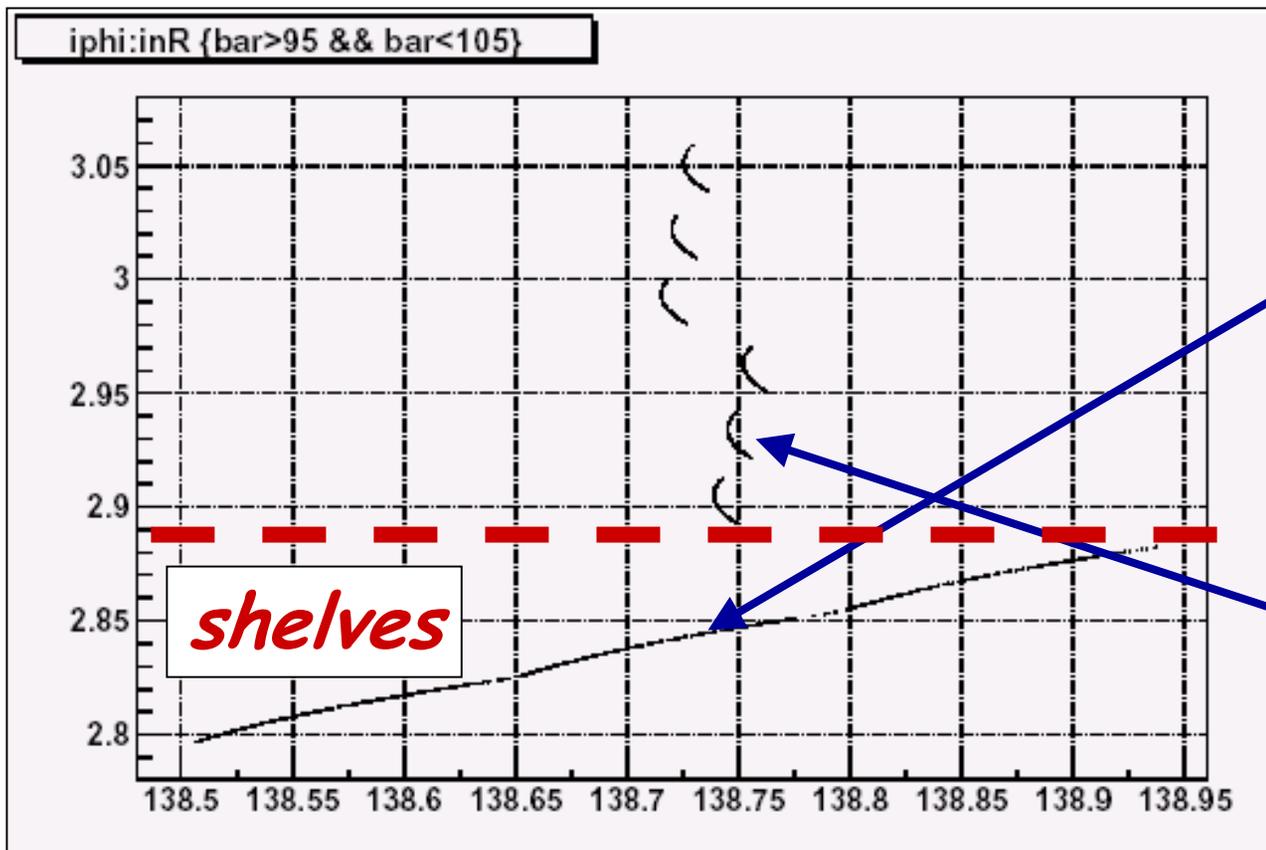
positive tracks disappear

bar 98

bar 99



ϕ_{in} vs $R(in)$ for Bar [96,104]

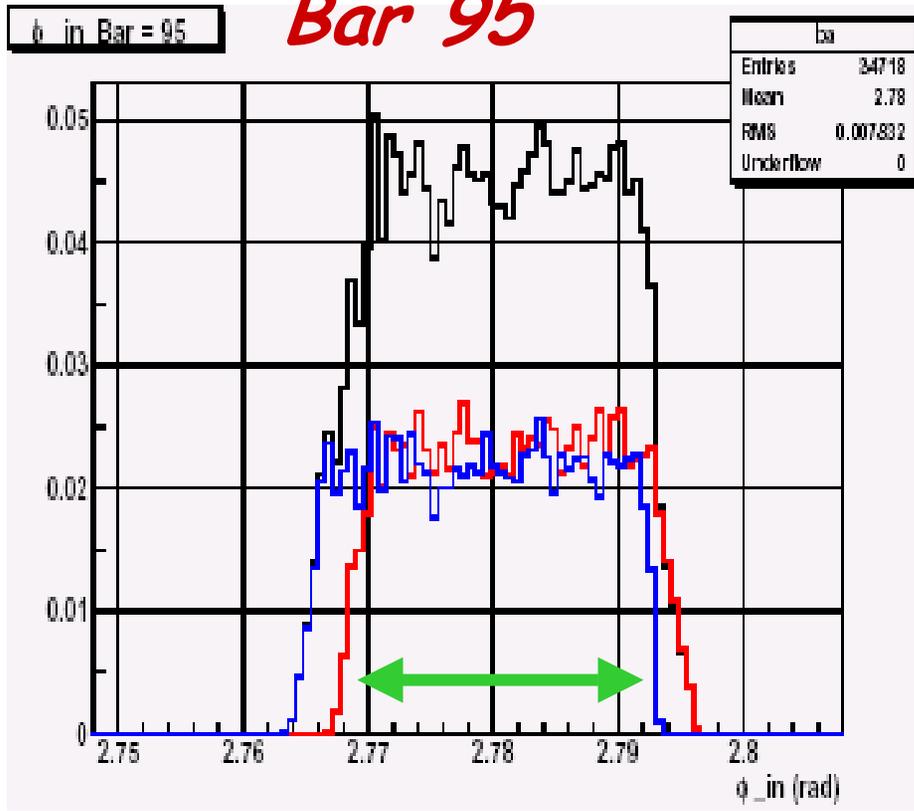


Procedure

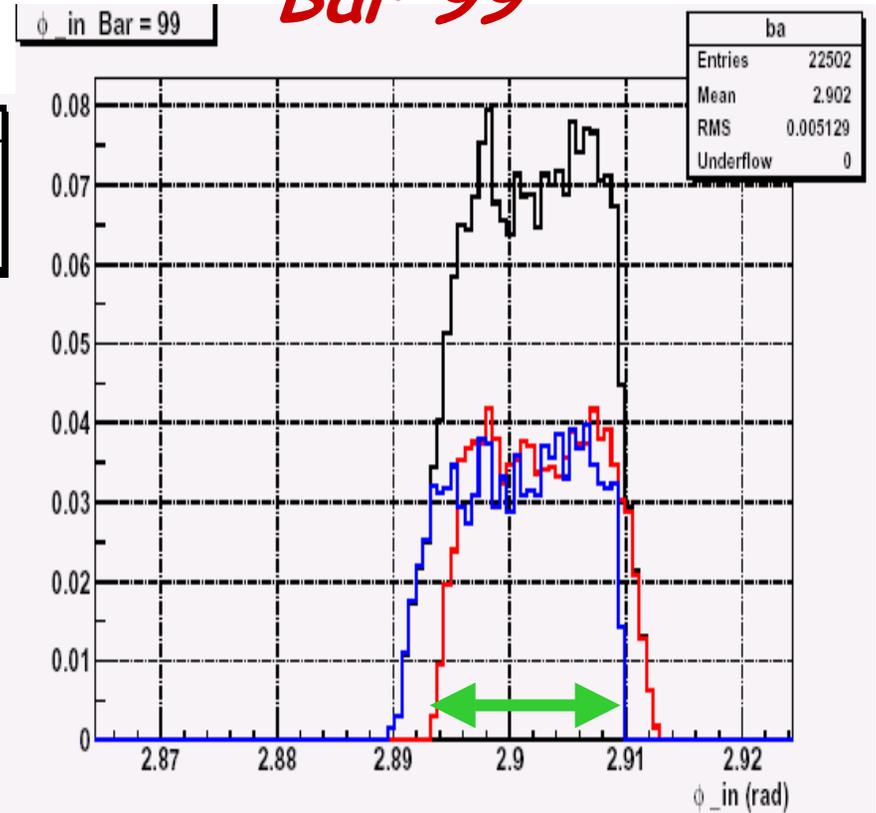
- *Use Track match **AFTER** TOF reconstruction*
- *Use **CdfTrack** with 2 PMT hits*
- *Use Helix to find φ at fixed R (R was set 140 cm)*
- *Plot φ for positive & negative track*
- *Take 'sharp edges'*
- *Calculate φ as a mean*

ϕ at fixed $R = 140$

Bar 95

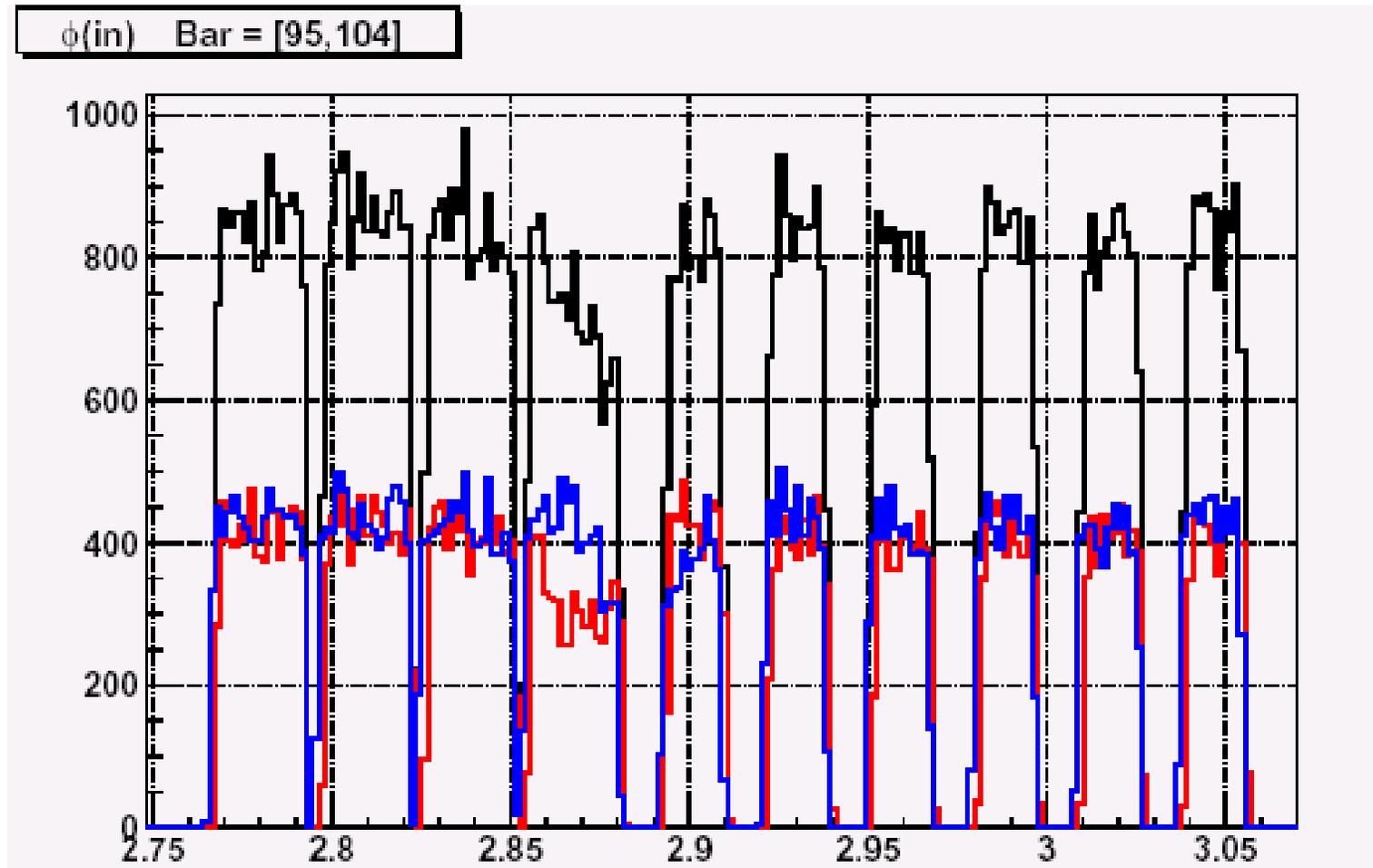


Bar 99



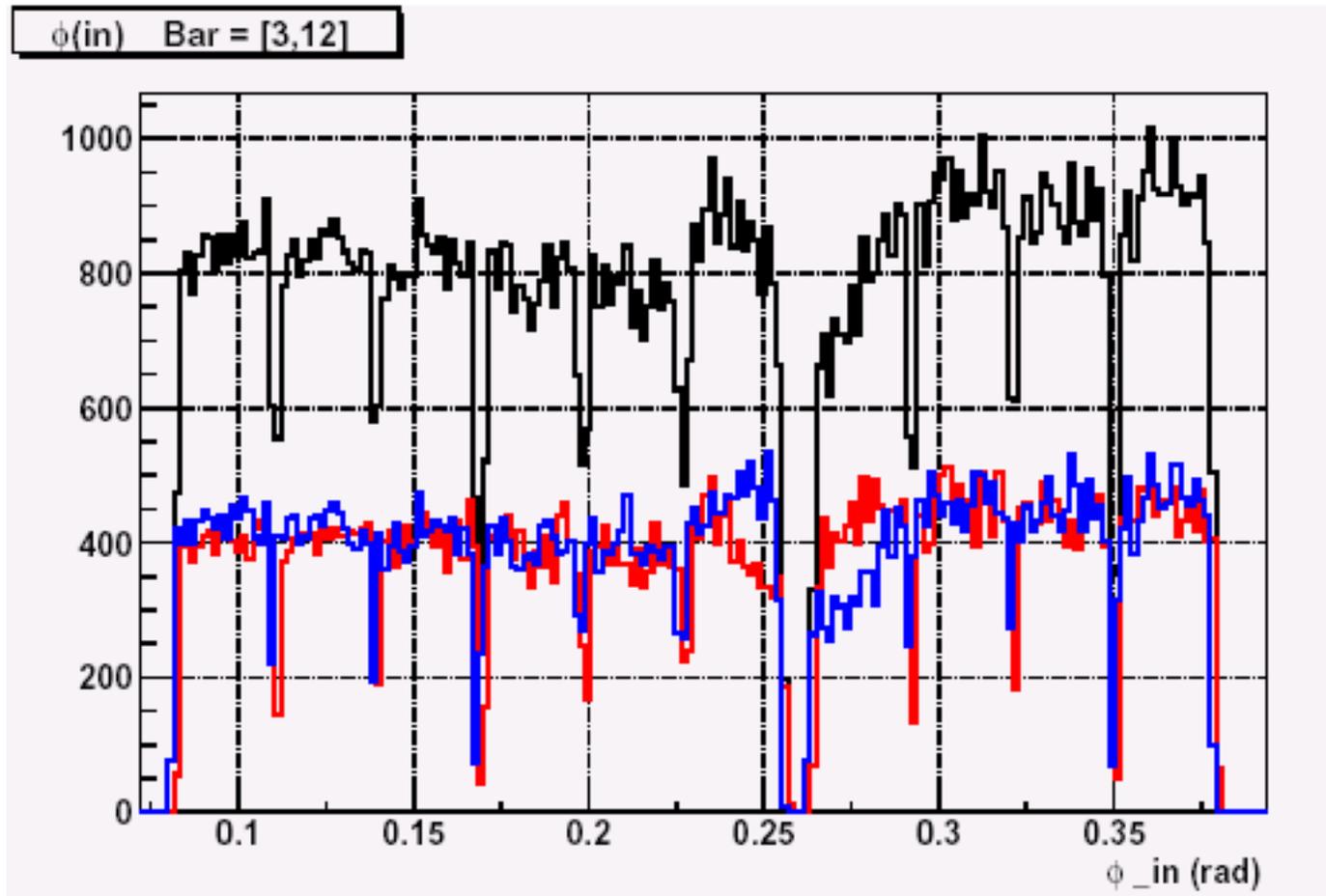
Use this shape to find bar position

ϕ at fixed R for bars [95,104]



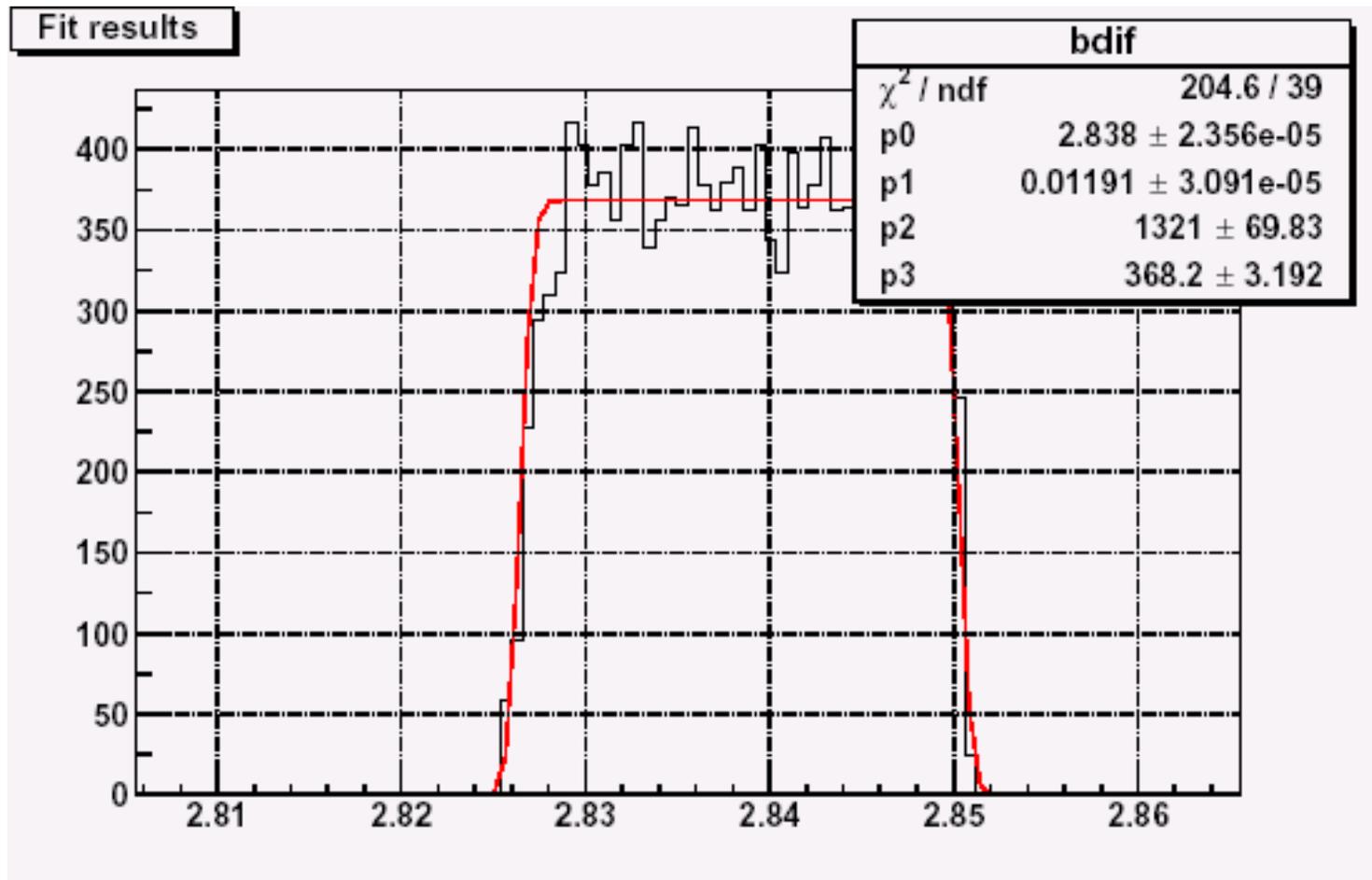
ϕ at $R = 140$ cm

ϕ at fixed R for bars [3,12]

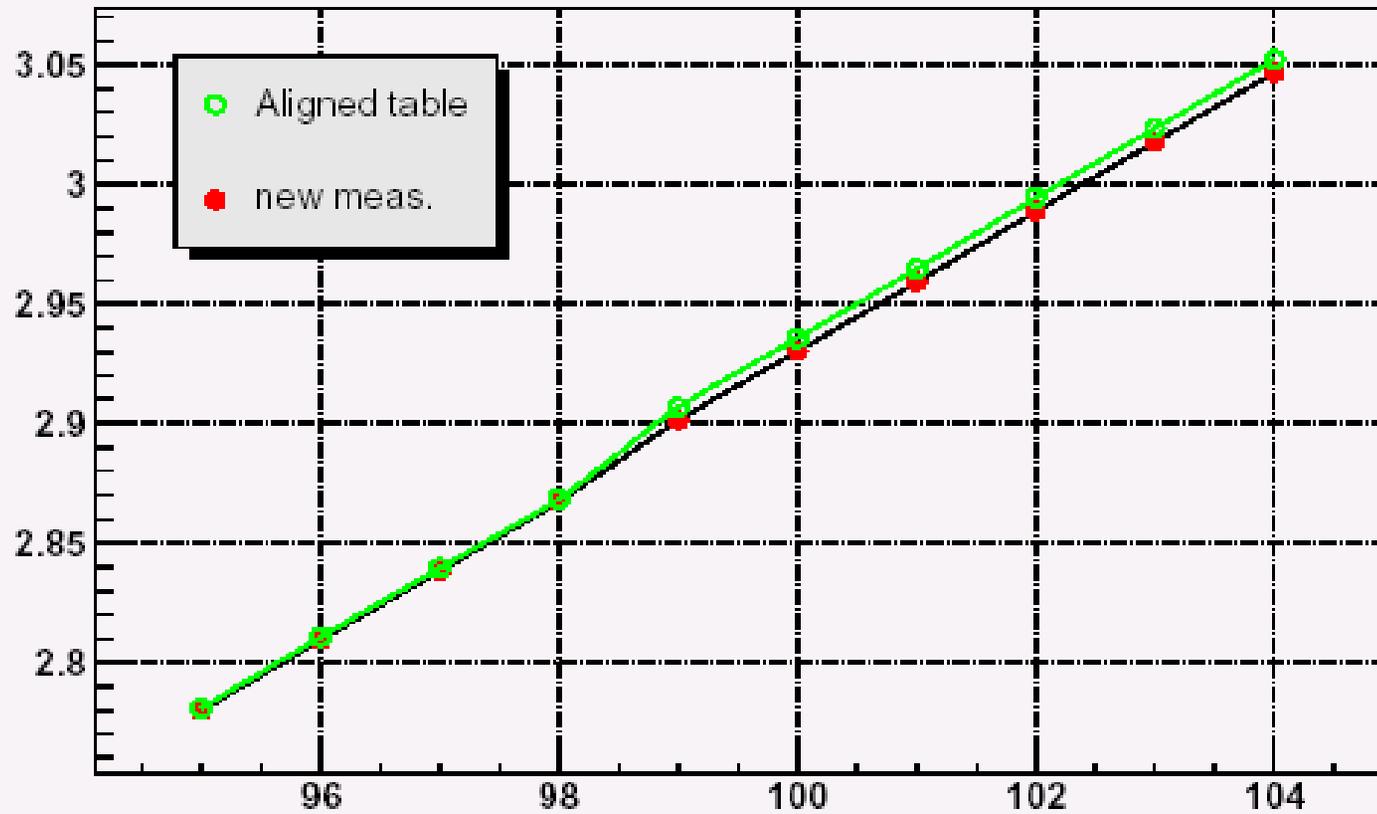


Fit example

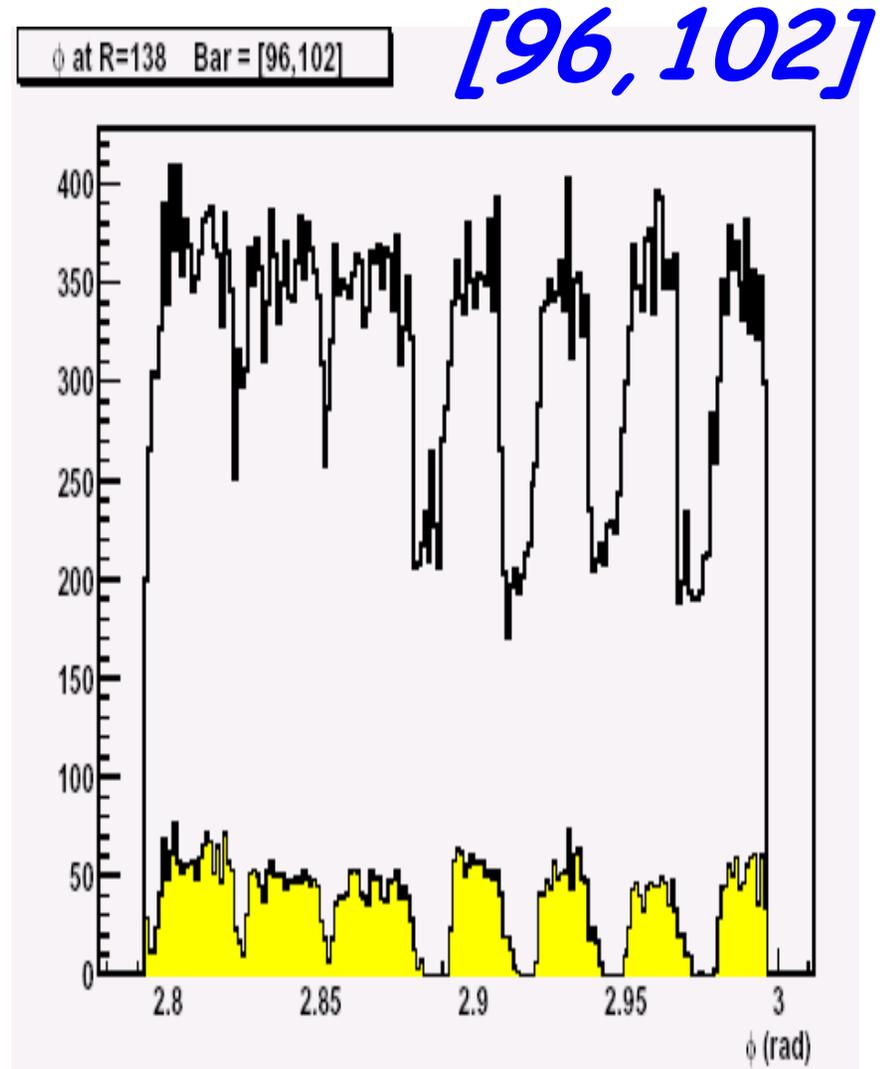
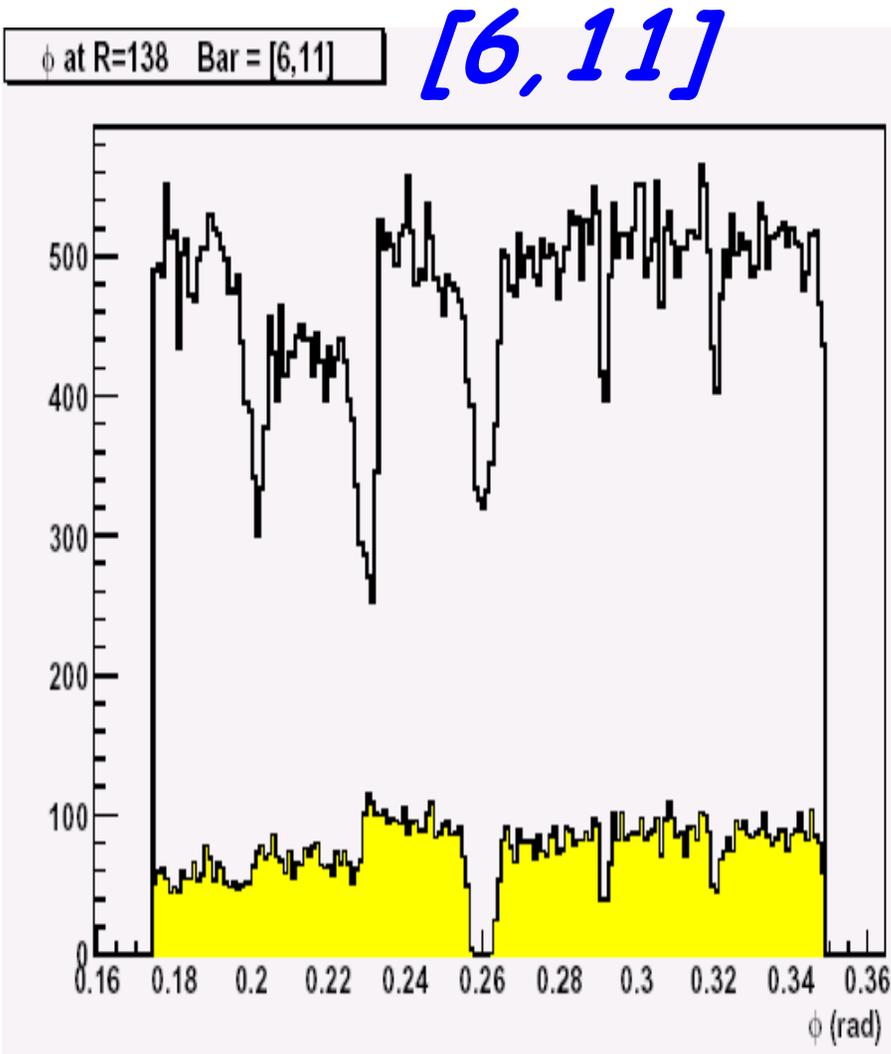
$$\text{Fitf} = 1/2 p_3 \cdot \{ \text{Erf}((x - [p_0 - p_1])) \cdot p_2) + \text{Erf}(([p_0 + p_1] - x) \cdot p_2) \}$$

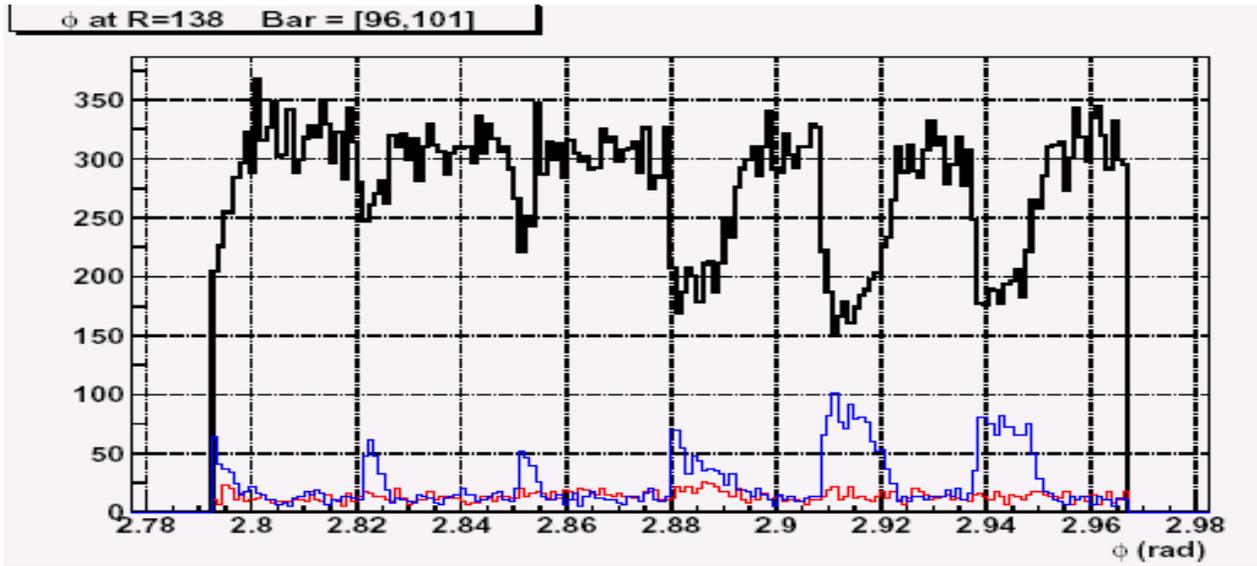


$\phi(\text{rad})$ vs bar number



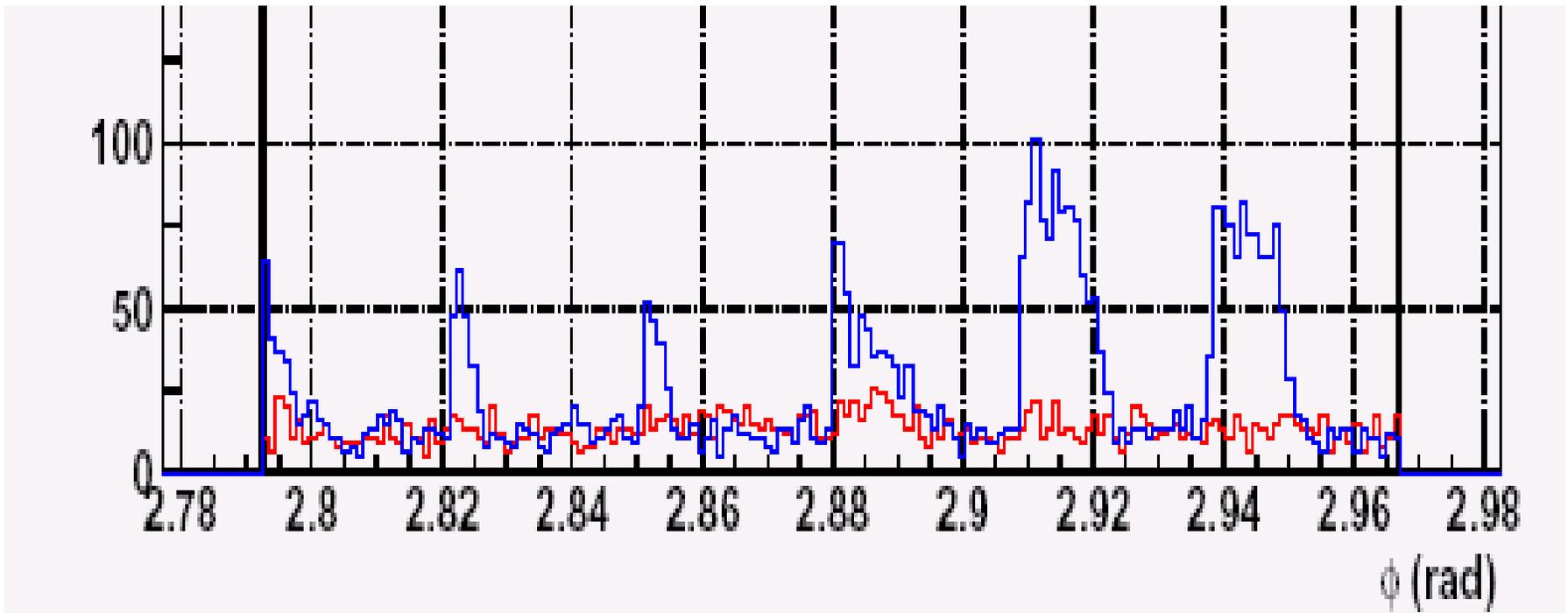
If we take CdfTracks with 2 PMT ...



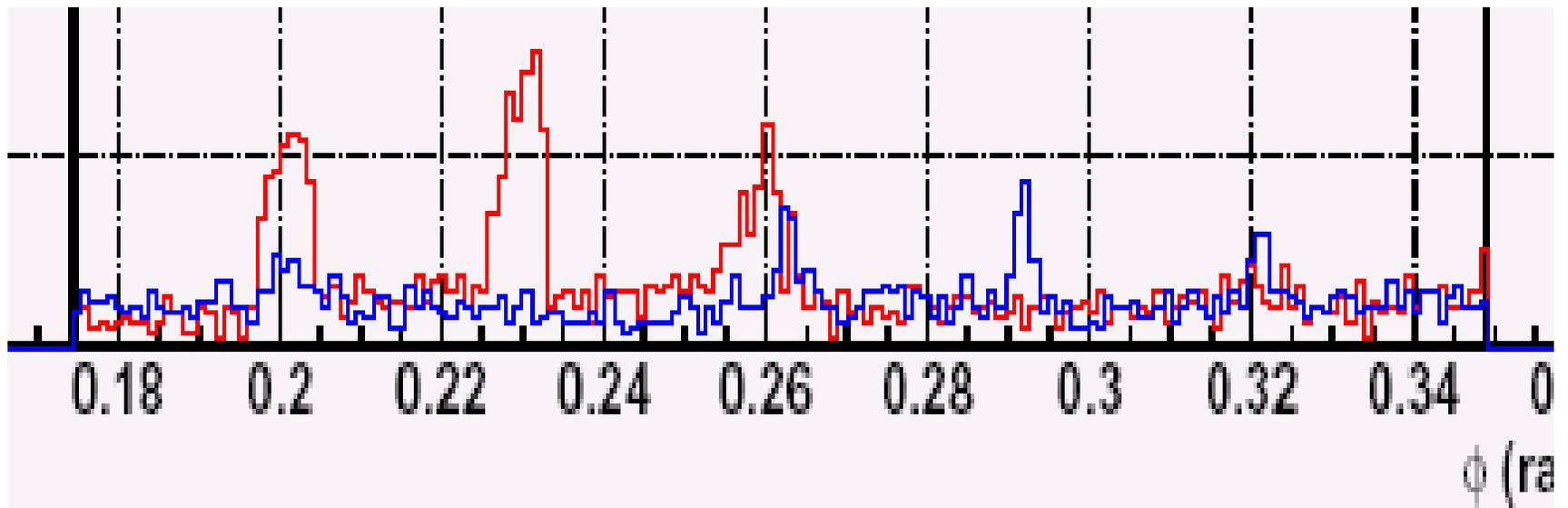
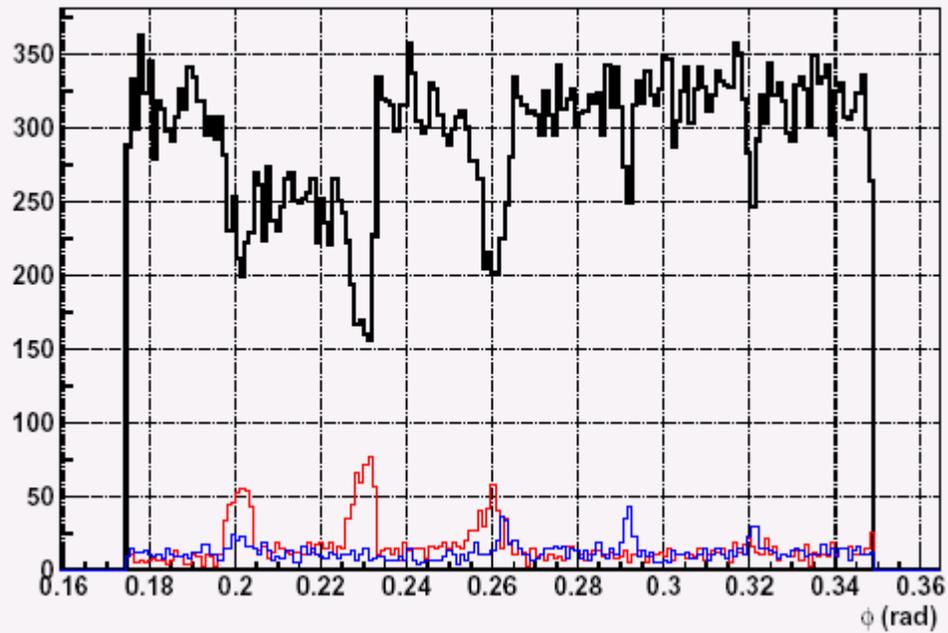


Bar N-1

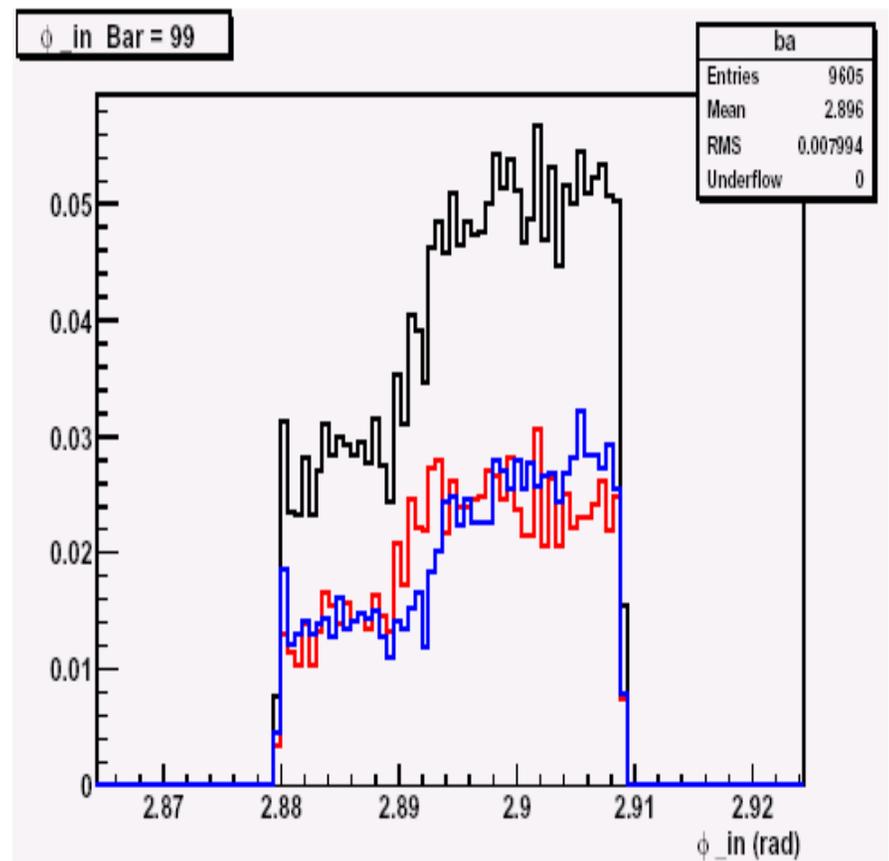
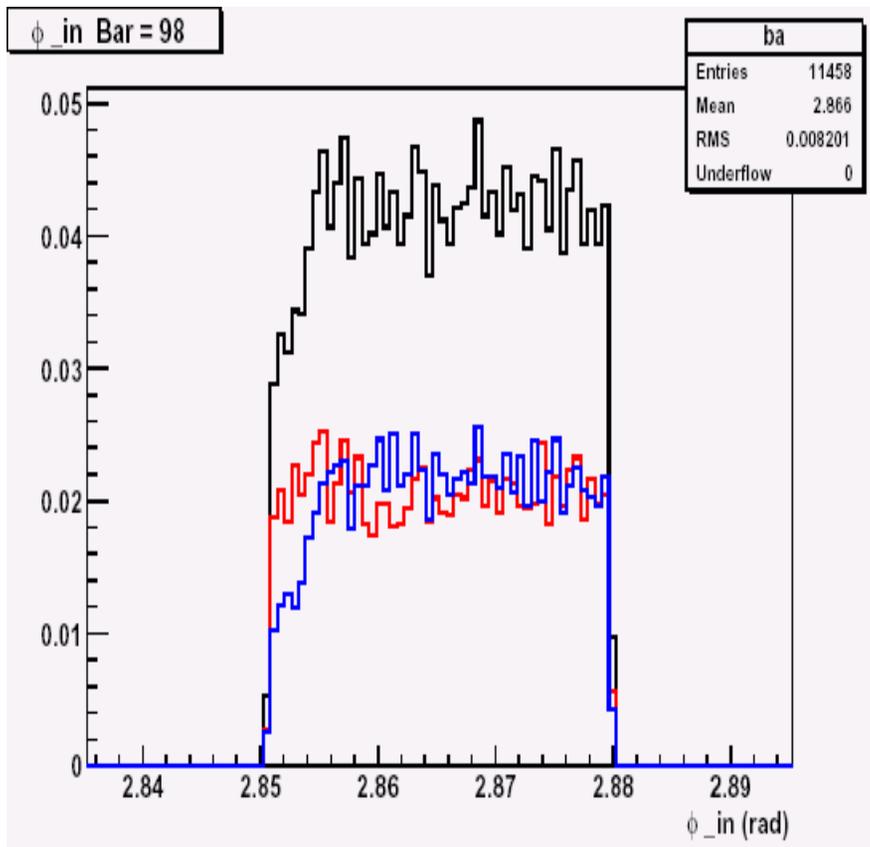
Bar N+1



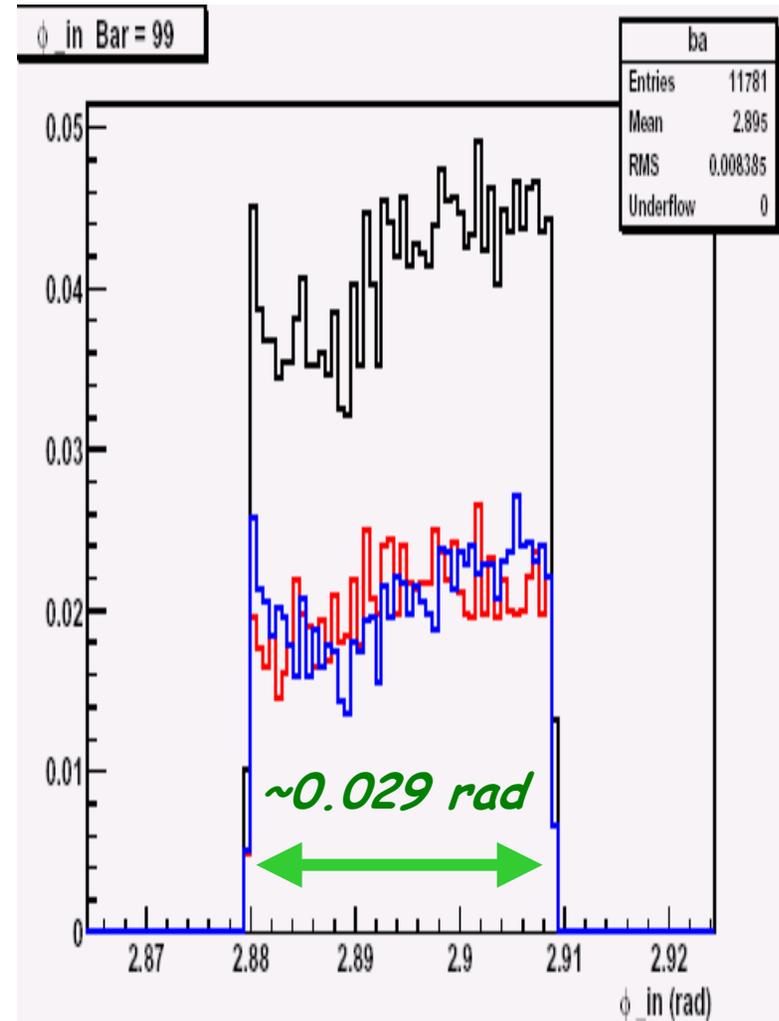
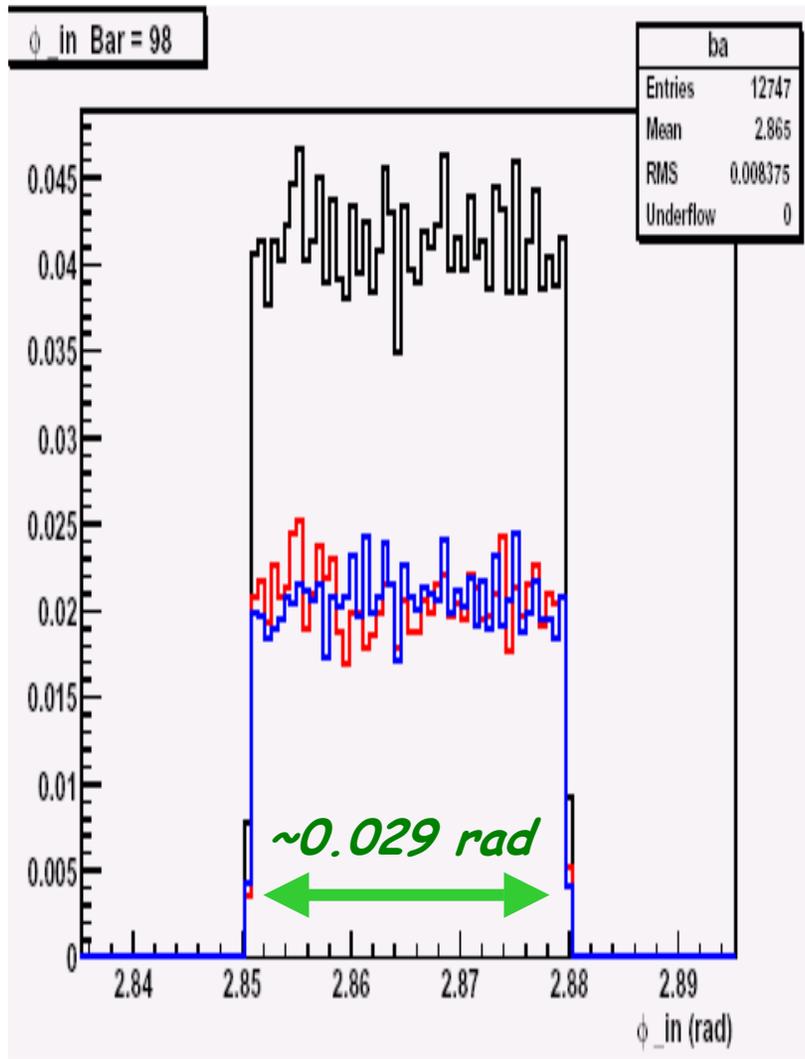
ϕ at R=138 Bar = [6,11]



+ & - tracks for bar 98, 99



Taking N , $N-1$, $N+1$...



Open issues:

- *need to find way to
match track-tof*
- *avoid using TofTrackView*
- *simply 2 PMT seems
to be not sufficient*