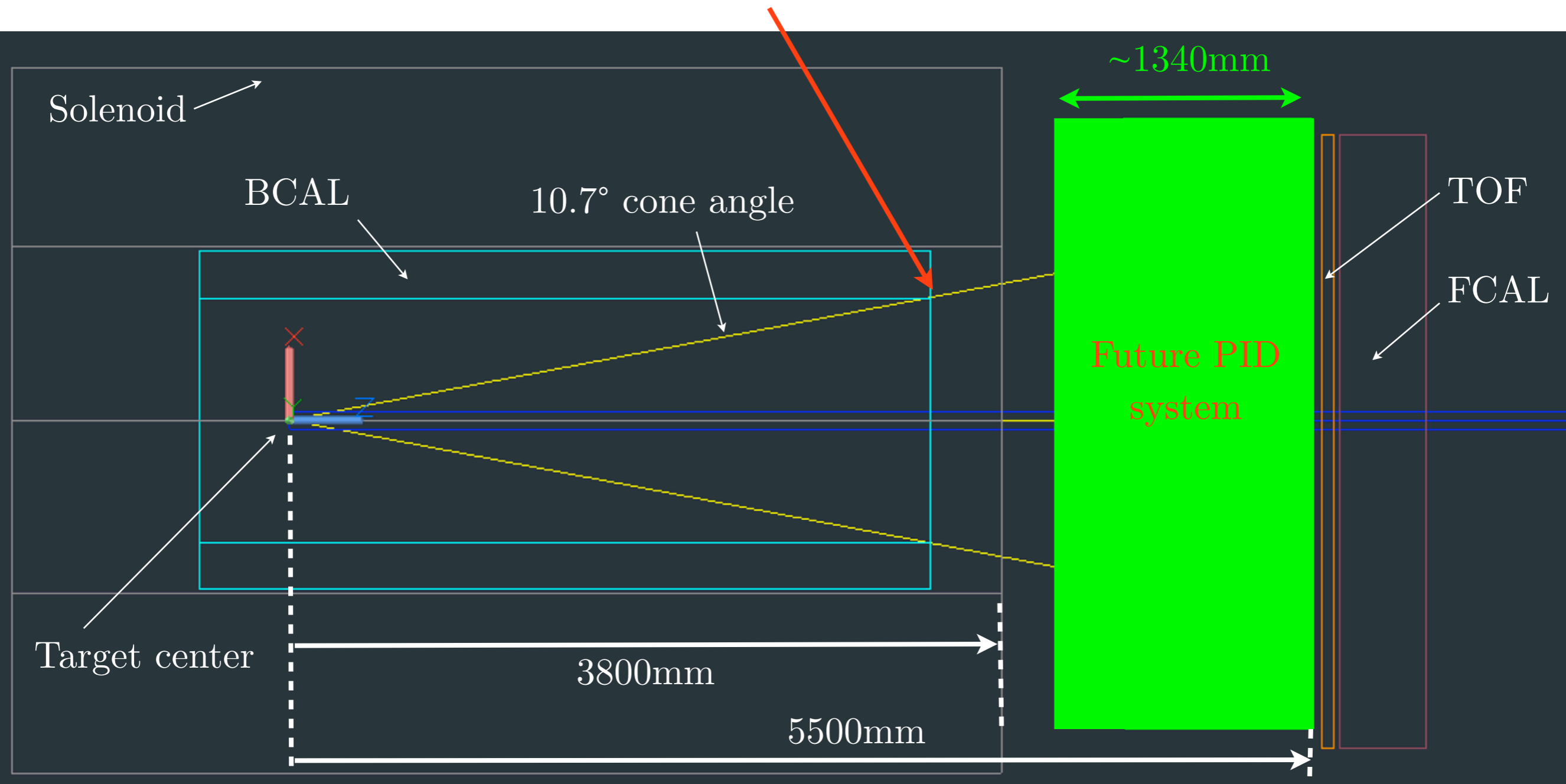


DIRC for GlueX

DIRC bars from BaBar experiment:

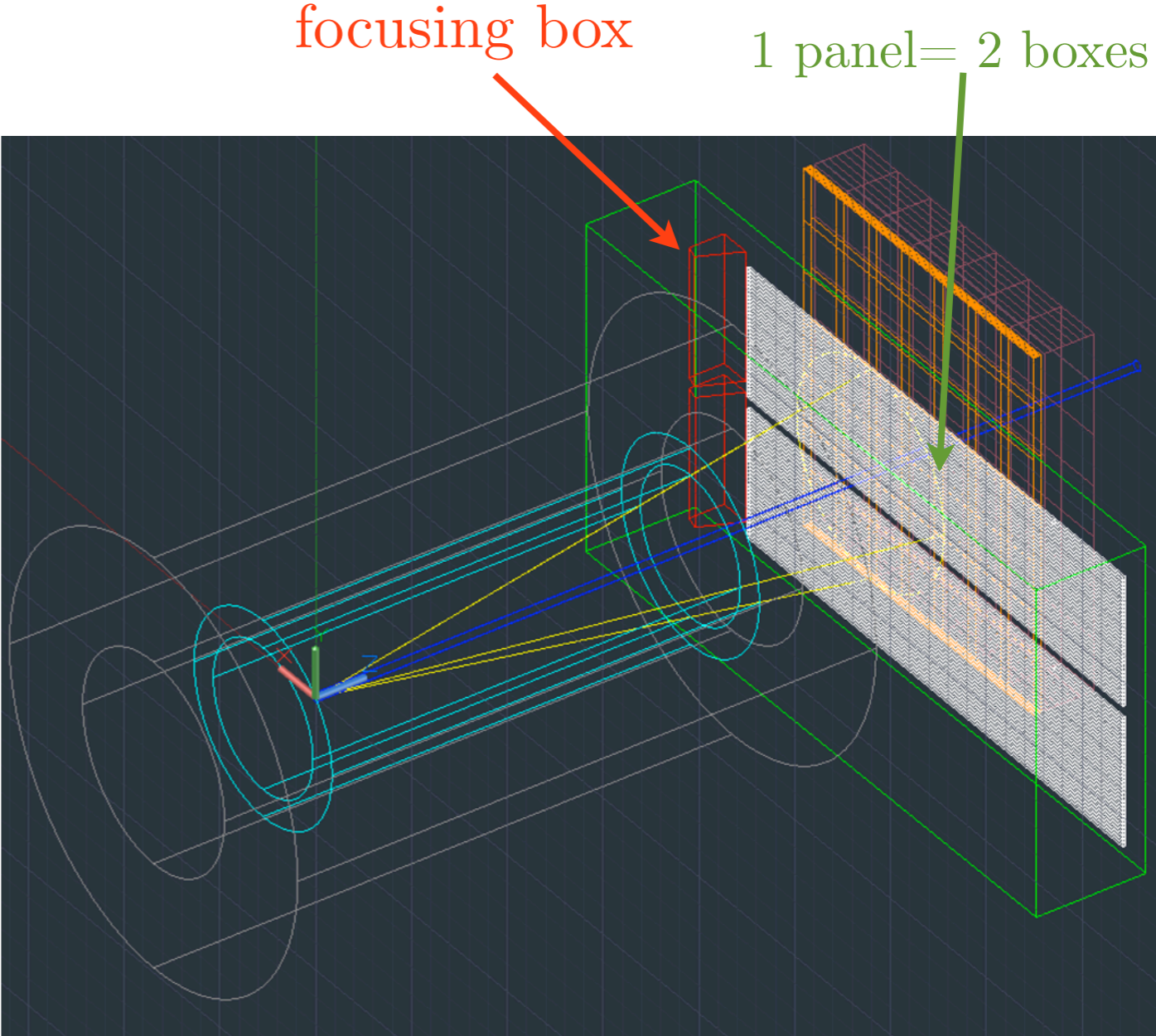
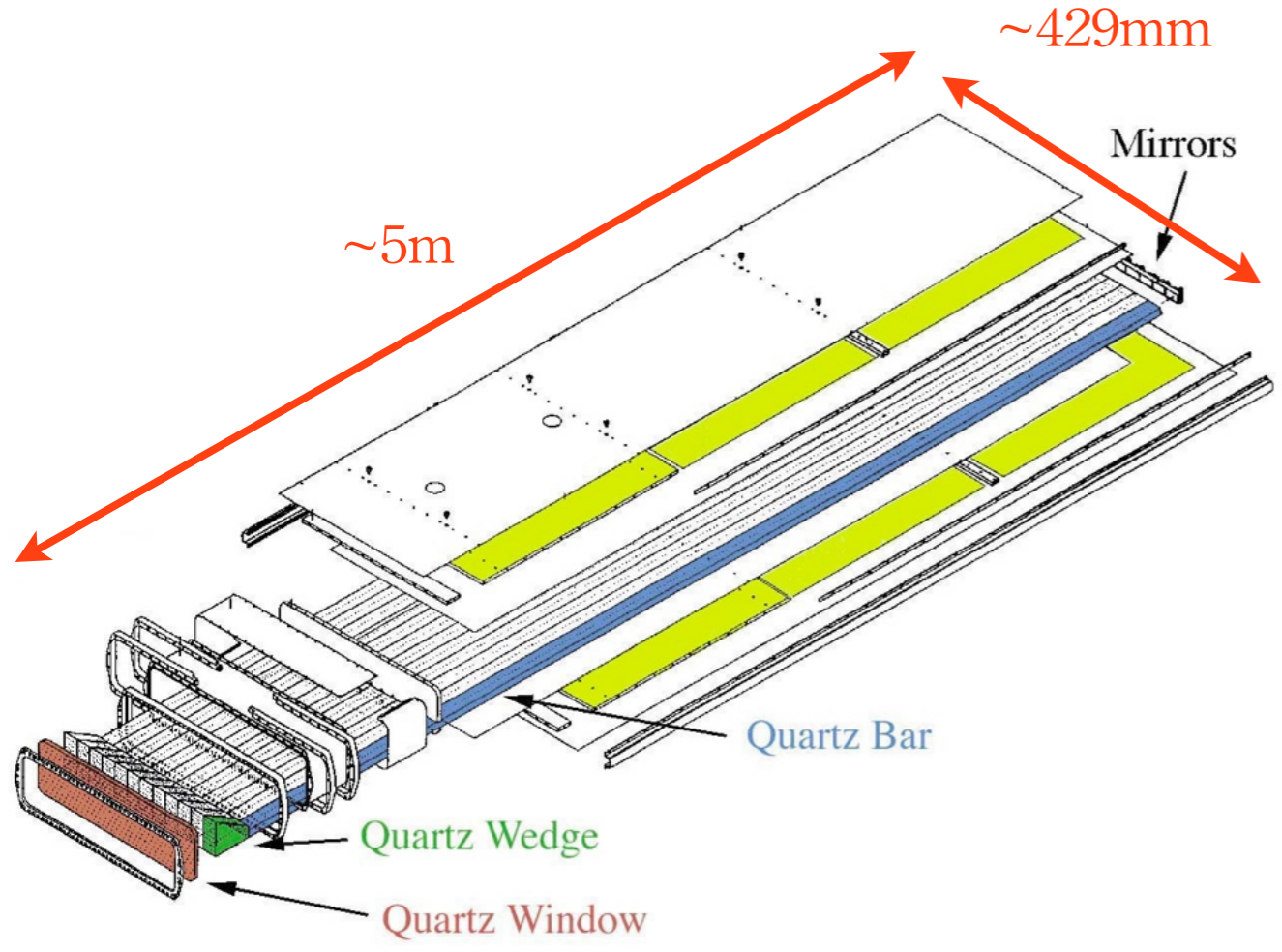
→ 3σ separation for π/K from $2\text{GeV}(\text{TOF limit}) < p < 4.5 \text{ GeV}$ (DIRC limit)

Acceptance limitation: π/K separation available in the forward region: $< 10.7^\circ$

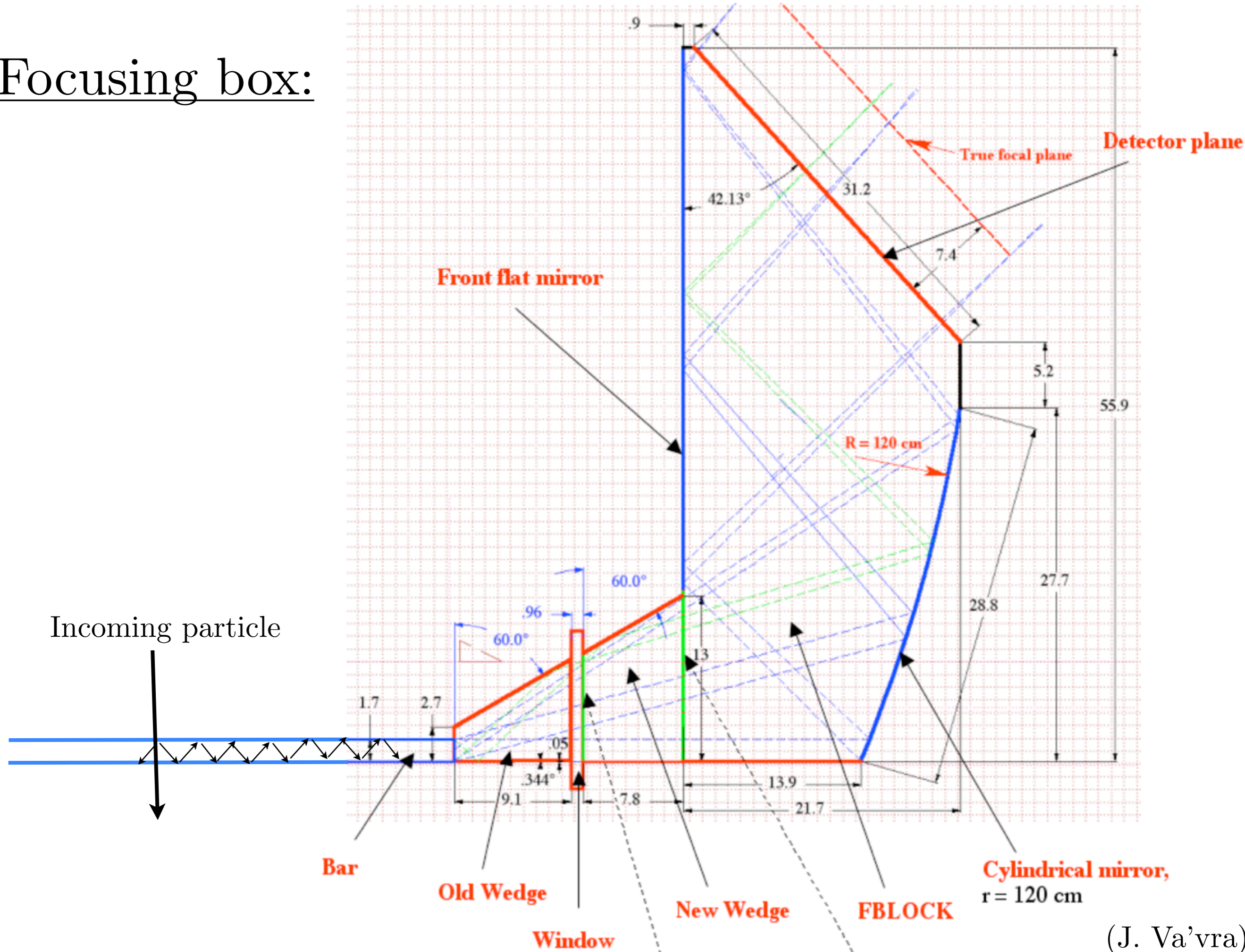


Impossibility to get out the bars from their box without a risk of significant damage (J. Va'vra)

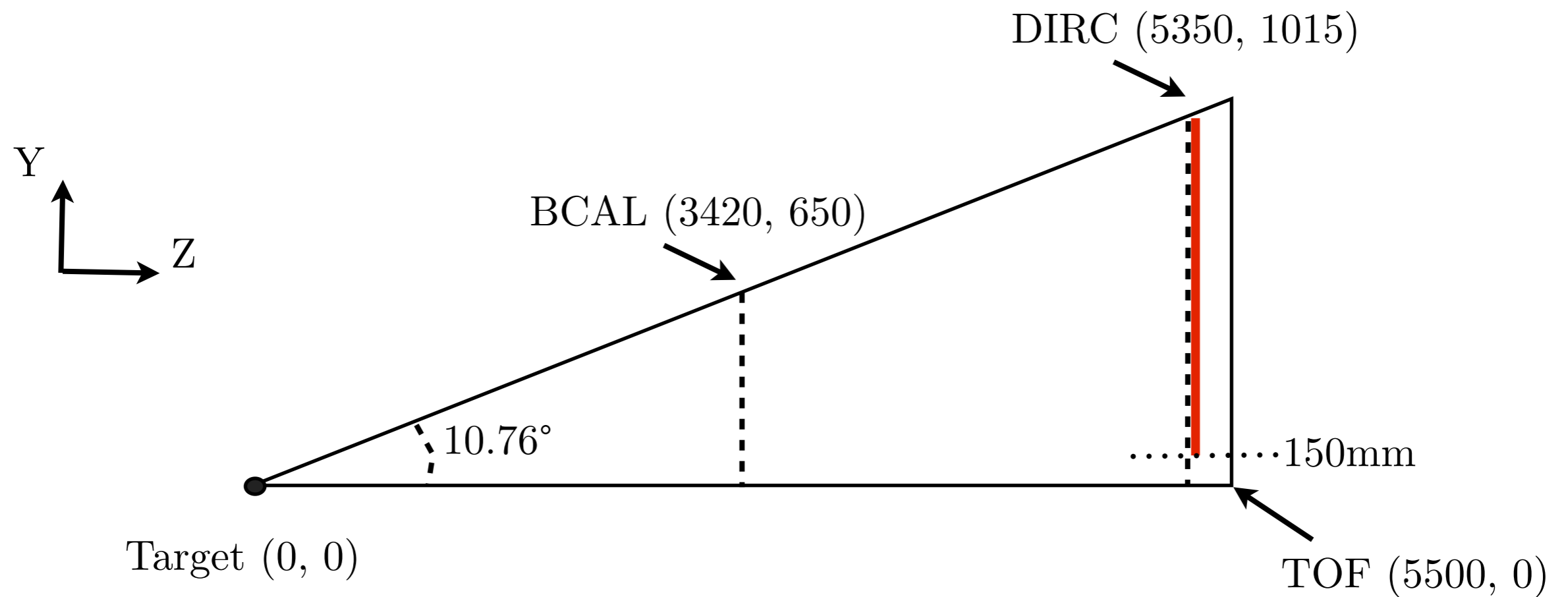
- The symmetric design (double side PMTs) looks not feasible anymore (do we still need the CKOV?, cf Justin presentation).
- Re-use 4 Babar boxes (4*12 bars), as they are now.
- Forming 2 panels (2 boxes each) in order to cover the 10.7° in the forward region, perpendicular to the beam axis.
- «Plugging» a focusing box to each of the 4 boxes (compact and similar performance /Babar)



Focusing box:



Z-positioning of the boxes:



At $Z=5350\text{mm}$, one needs to cover $Y=1015\text{mm}$ for the full 10.76°

One Babar box is 429mm , so with 2 boxes we cover $\sim 860\text{mm}$

Starting at $Y=150\text{mm}$ (so $\sim 1.5^\circ$), we can cover Y up to $150+860=1010\text{mm}$, so almost the 10.76°

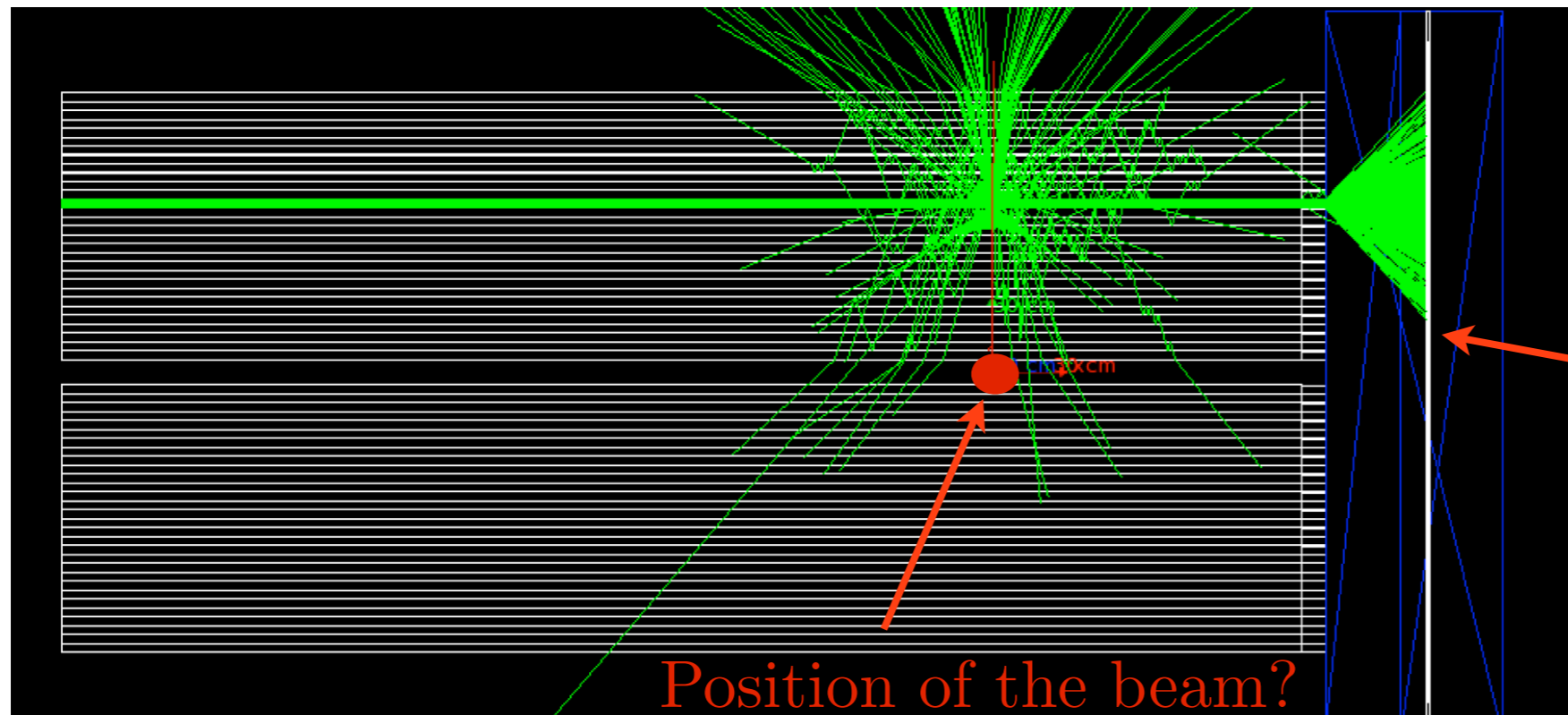
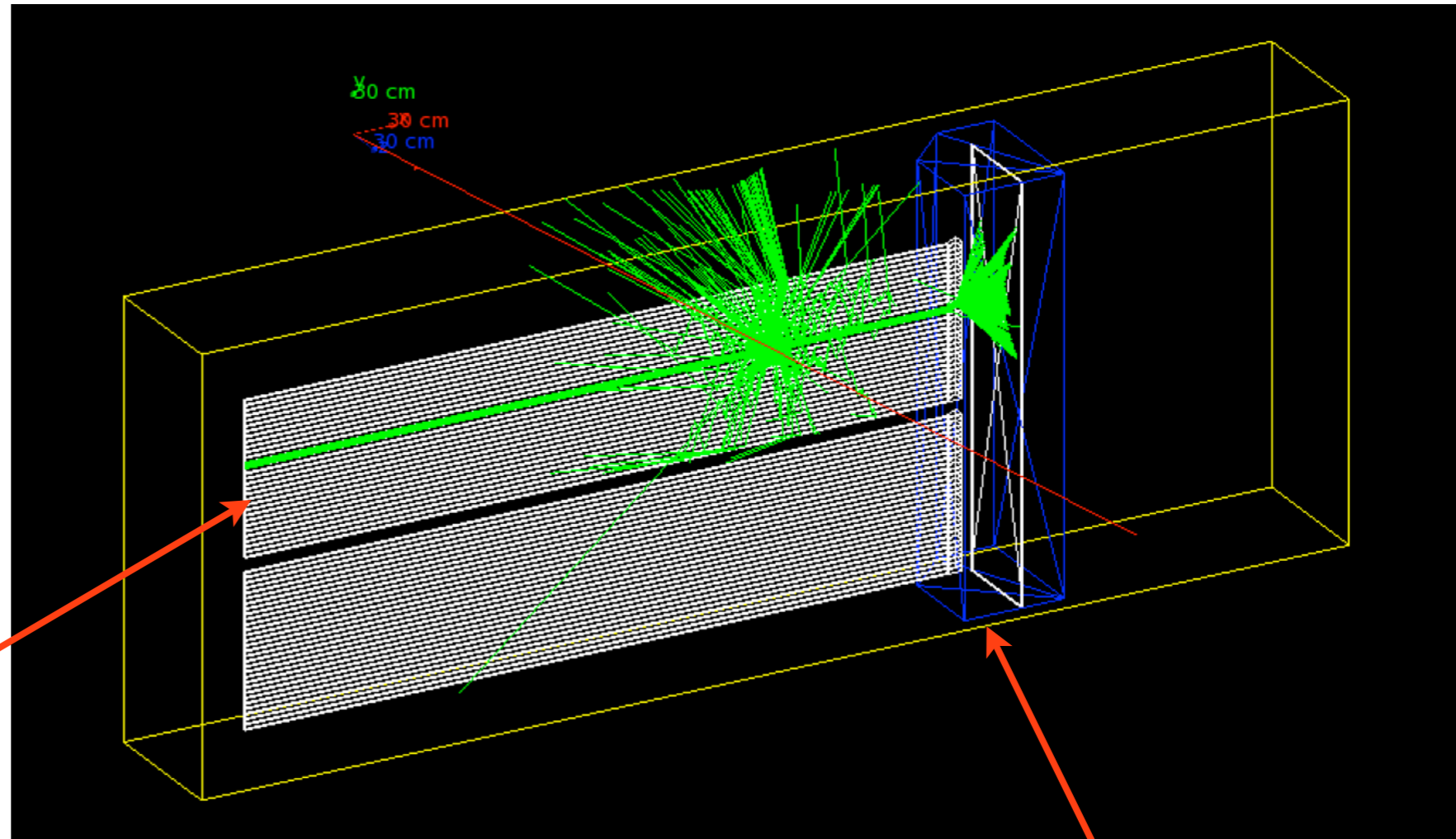
GEANT4:

$$\pi^- = 3\text{GeV}$$

Thrown at:

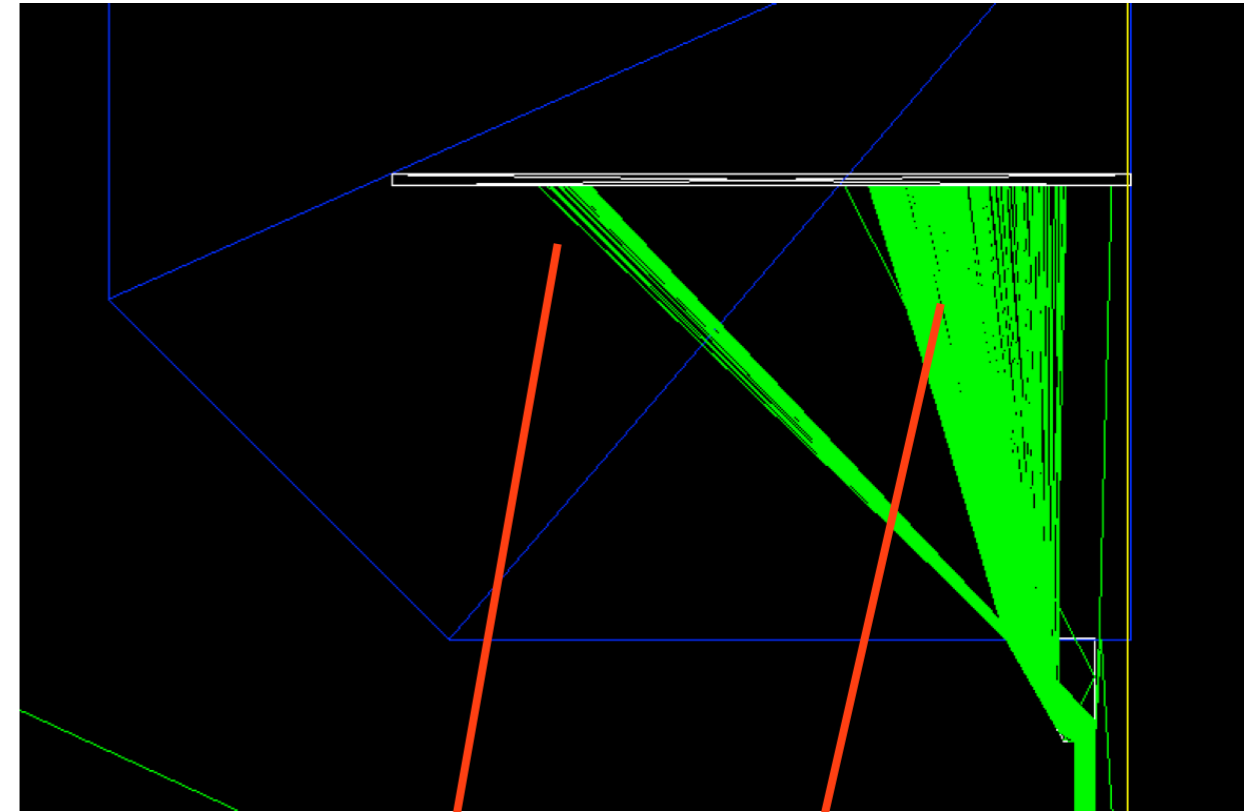
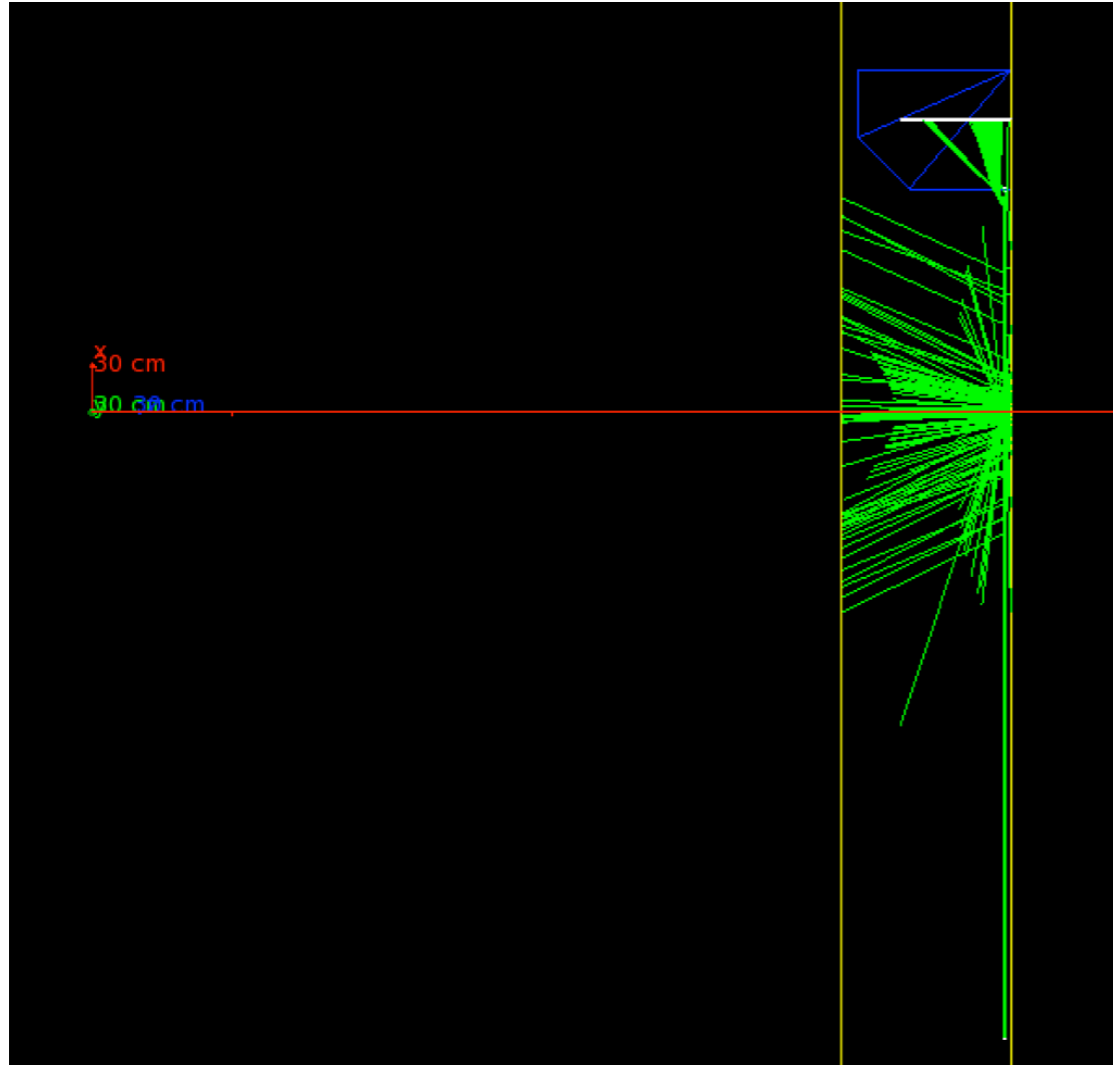
$$\theta = 7^\circ, \phi = 90^\circ$$

The boxes are not fully simulated here, only the 4.9m long bars + mirrors + wedges

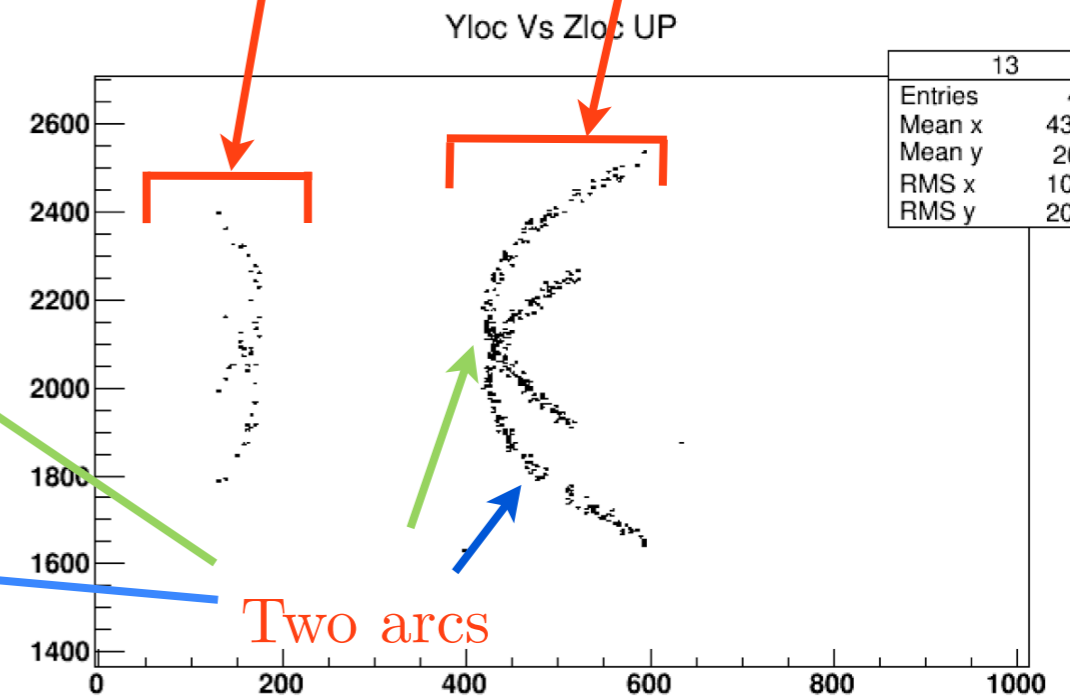
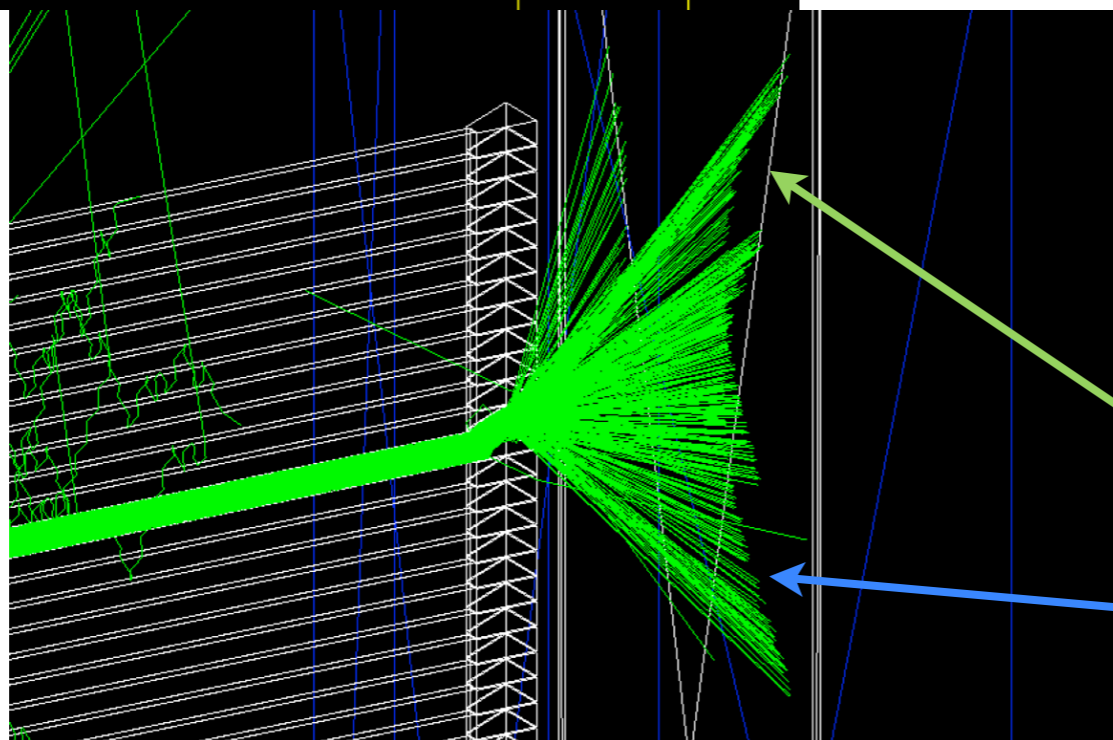


The focusing box is not simulated, but is represented by the blue box, in which the white plan is used as an absorber of photons and allow the visualization of the photon distribution

more GEANT4 pictures:

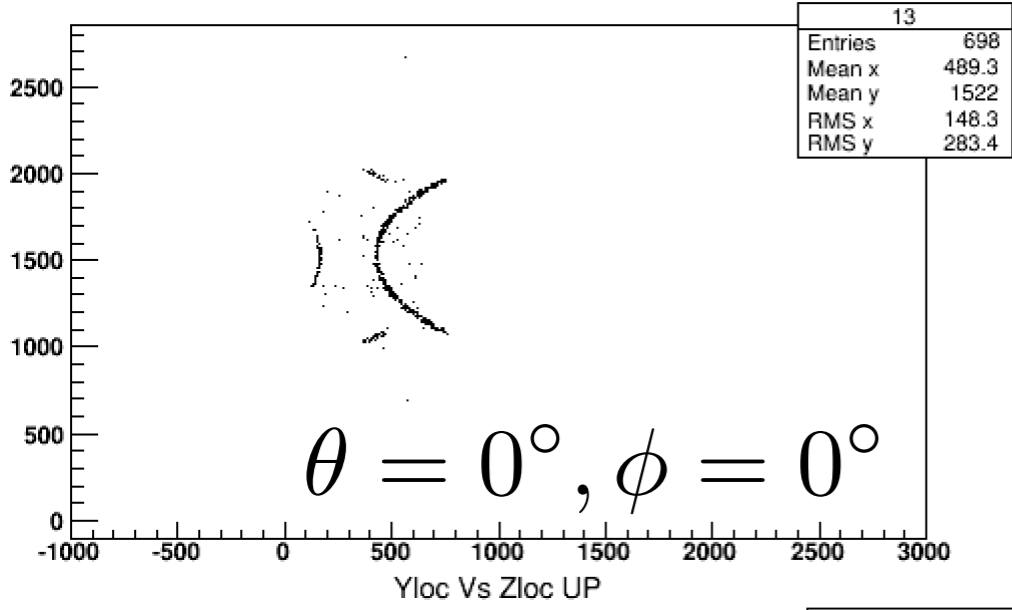


Projection of the photons on the white plan

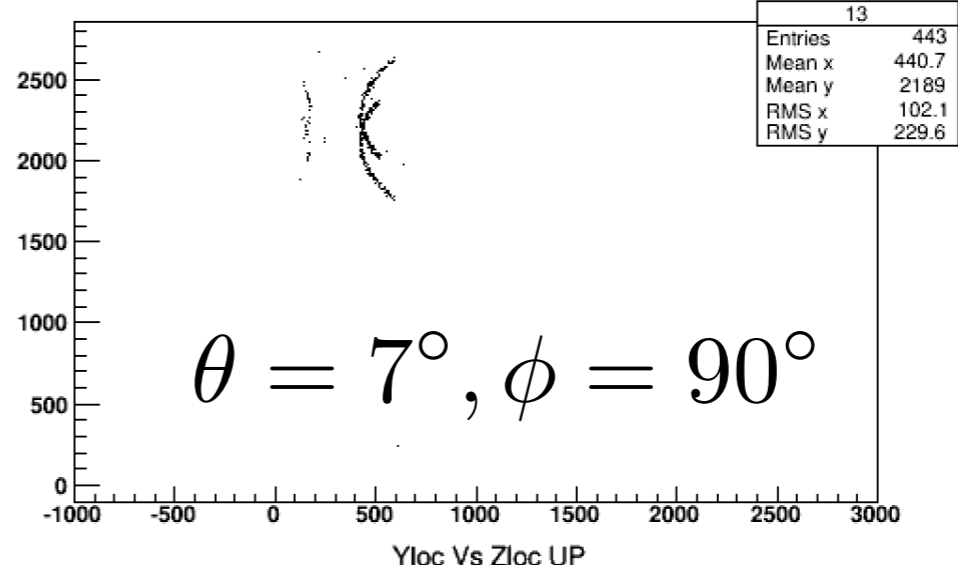


Changing the incoming particle angle in a bar:

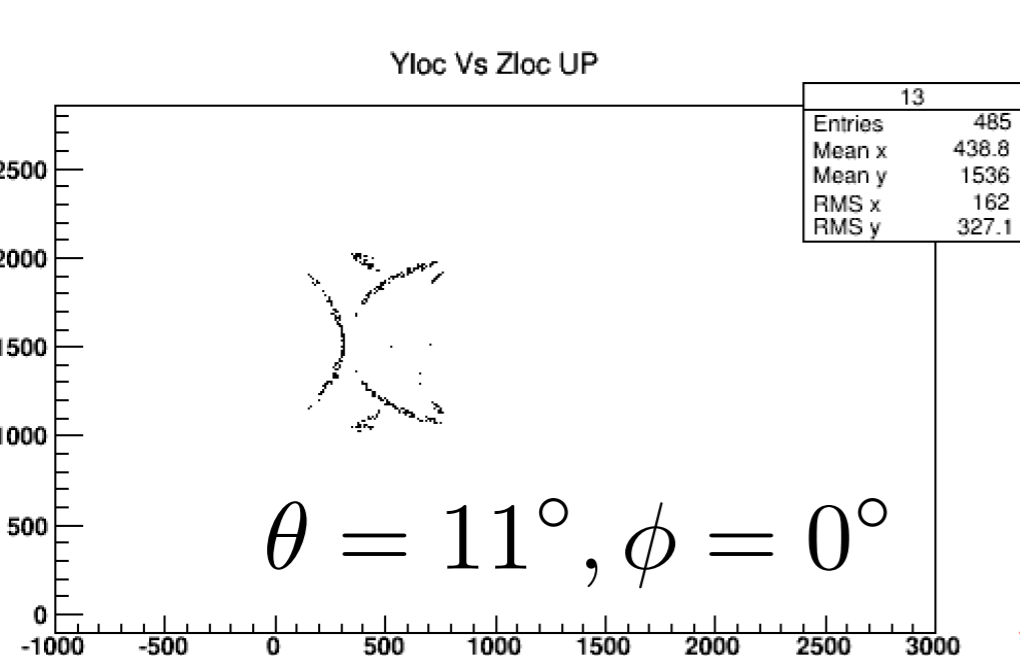
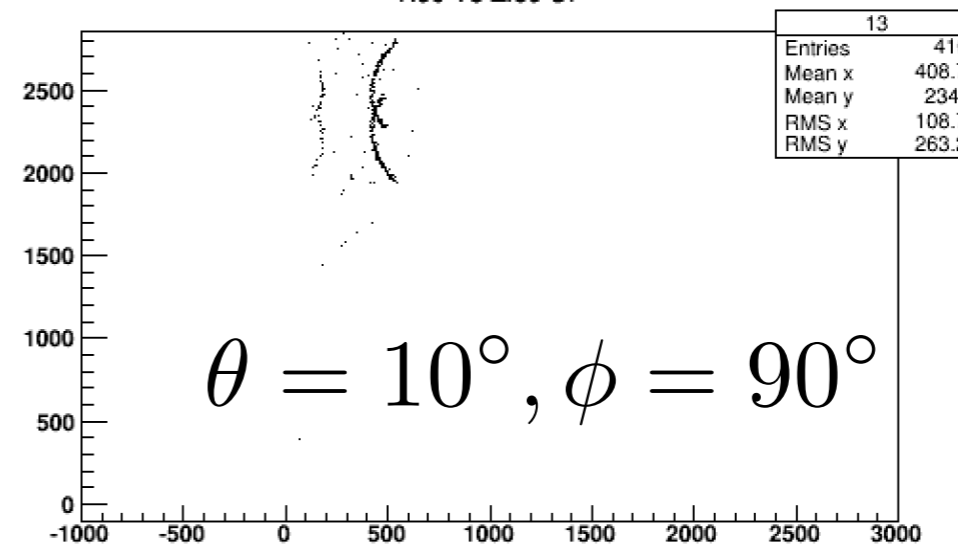
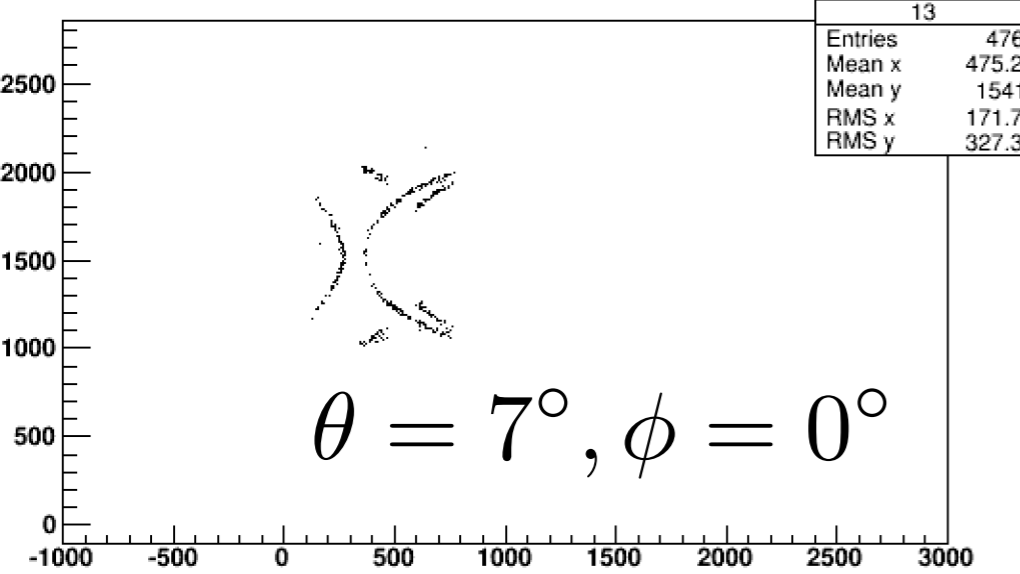
Yloc Vs Zloc UP



Yloc Vs Zloc UP

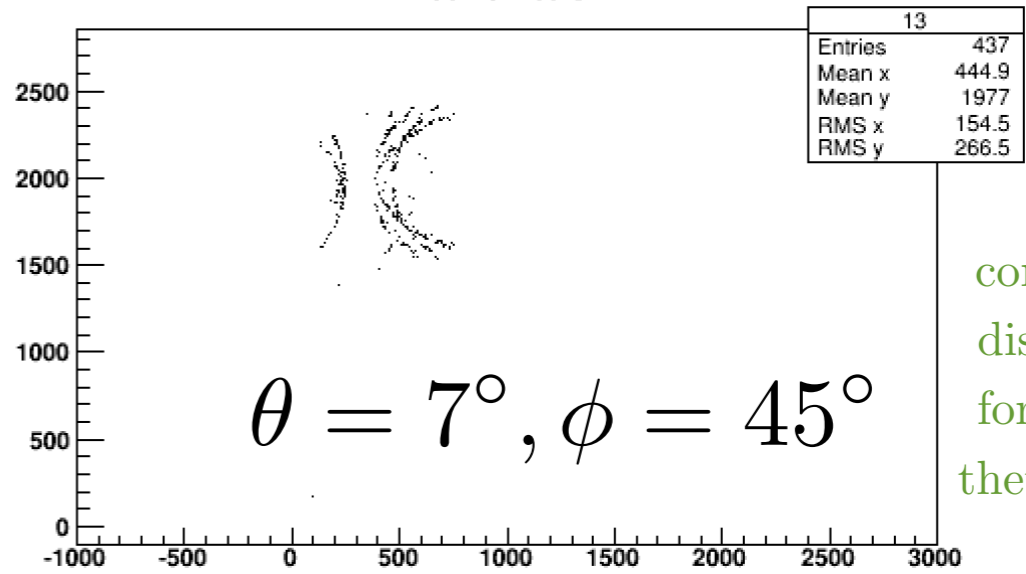


As theta increases for a fix phi, the distance between the two arcs increases



Increase of theta at fix phi

Yloc Vs Zloc UP



complicated distribution for a mix of theta and phi