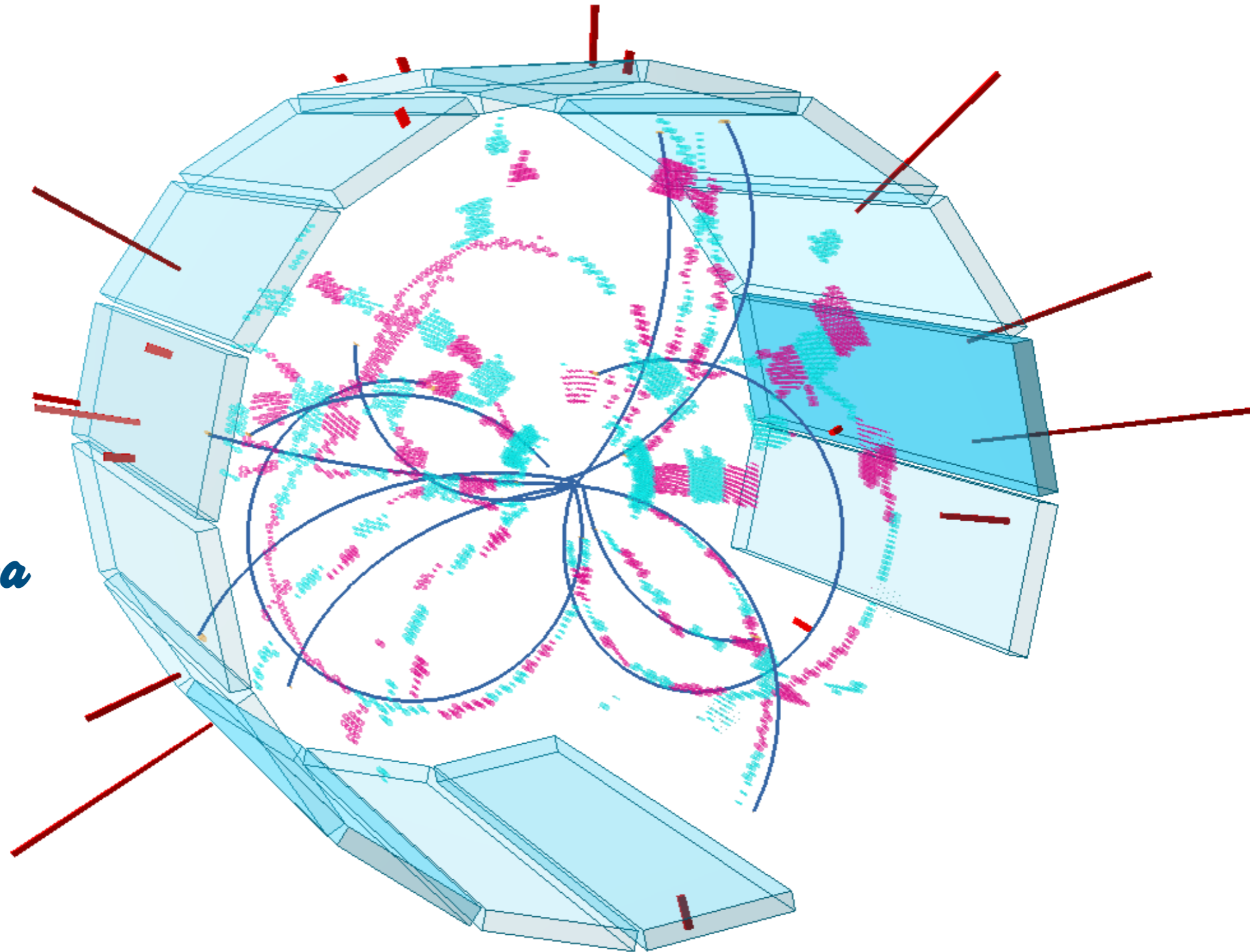


A First Look At Real Data



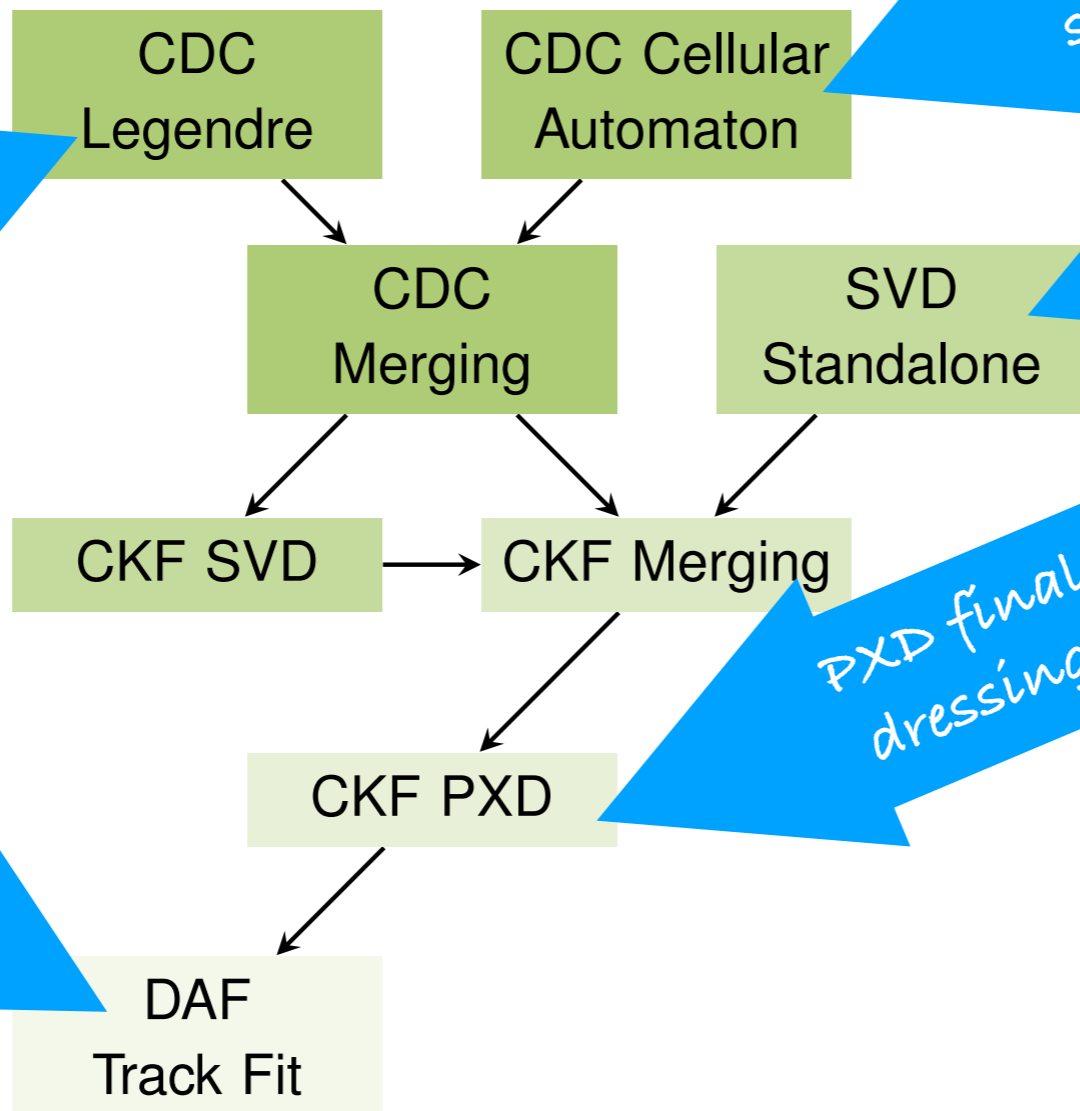
*E. P.
INFN &
Università di Pisa
on Behalf of
the BelleII
Tracking Crew*

Outlook

- ◆ Track finding and fitting data-flow
- ◆ Some facts and figures of the first luminosity runs
- ◆ Track parameters: a gentle introduction
- ◆ Studies on the Root-tuples made by Nils
- ◆ Beam Spot position determination
- ◆ What's about all this other stuff, anyhow?
- ◆ Organizational issues

Tracking Data-Flow

AN OVERVIEW



Global strategy: tracks from the IP

Local strategy: short, displaced tracks

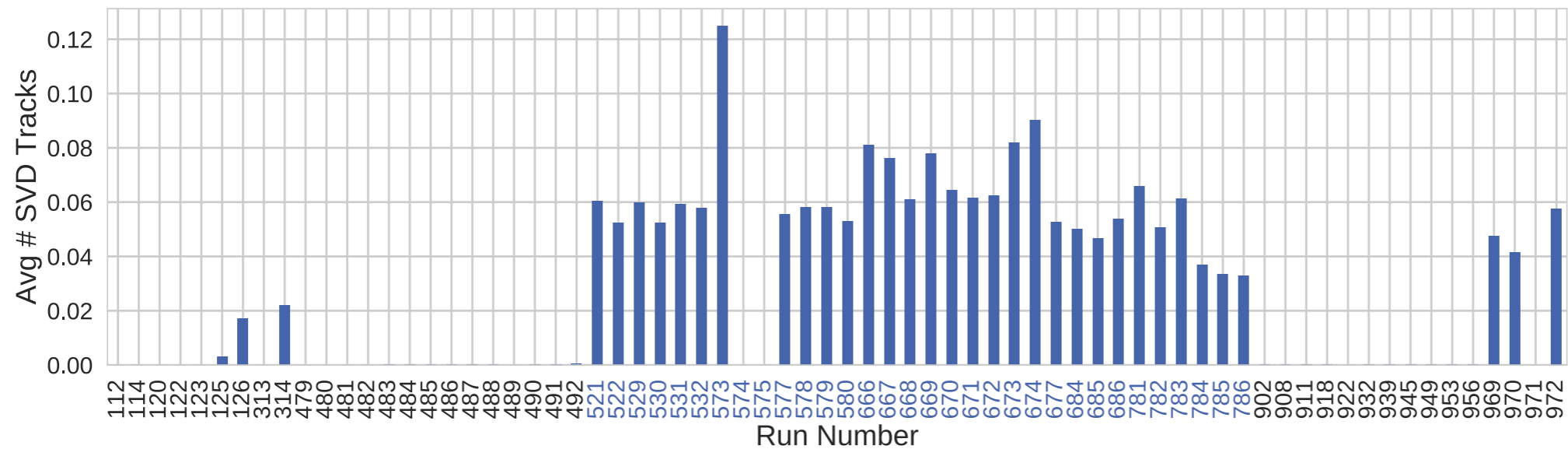
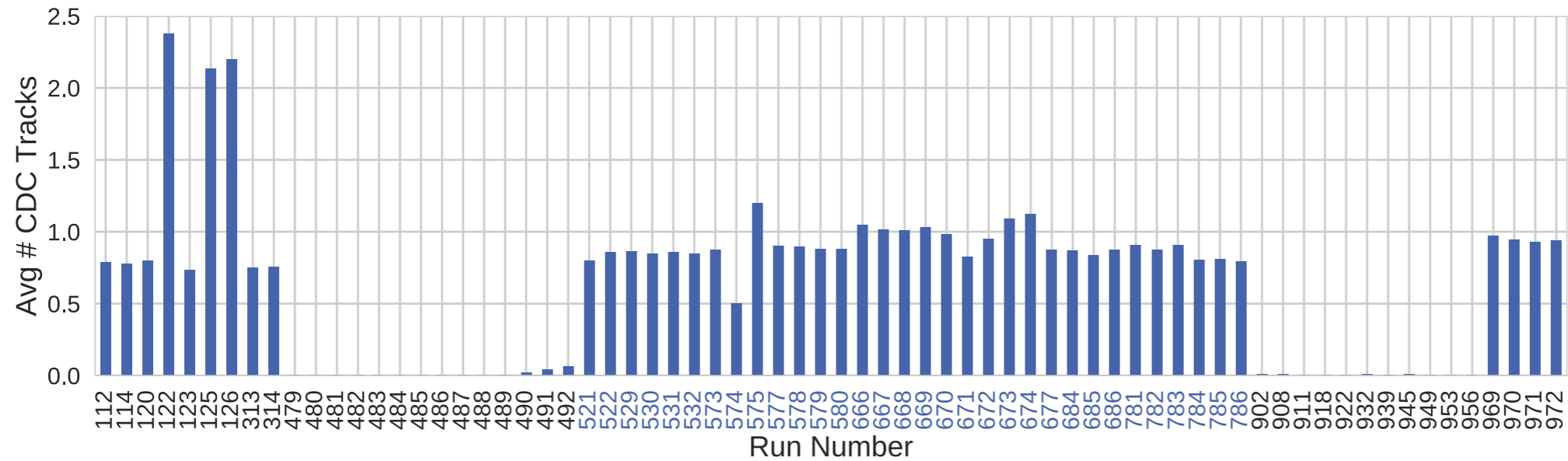
Low Pt tracks

Deterministic Annealing Filter

PXD final dressing

First Data Facts And Figures

OVERVIEW ON THE RUNS

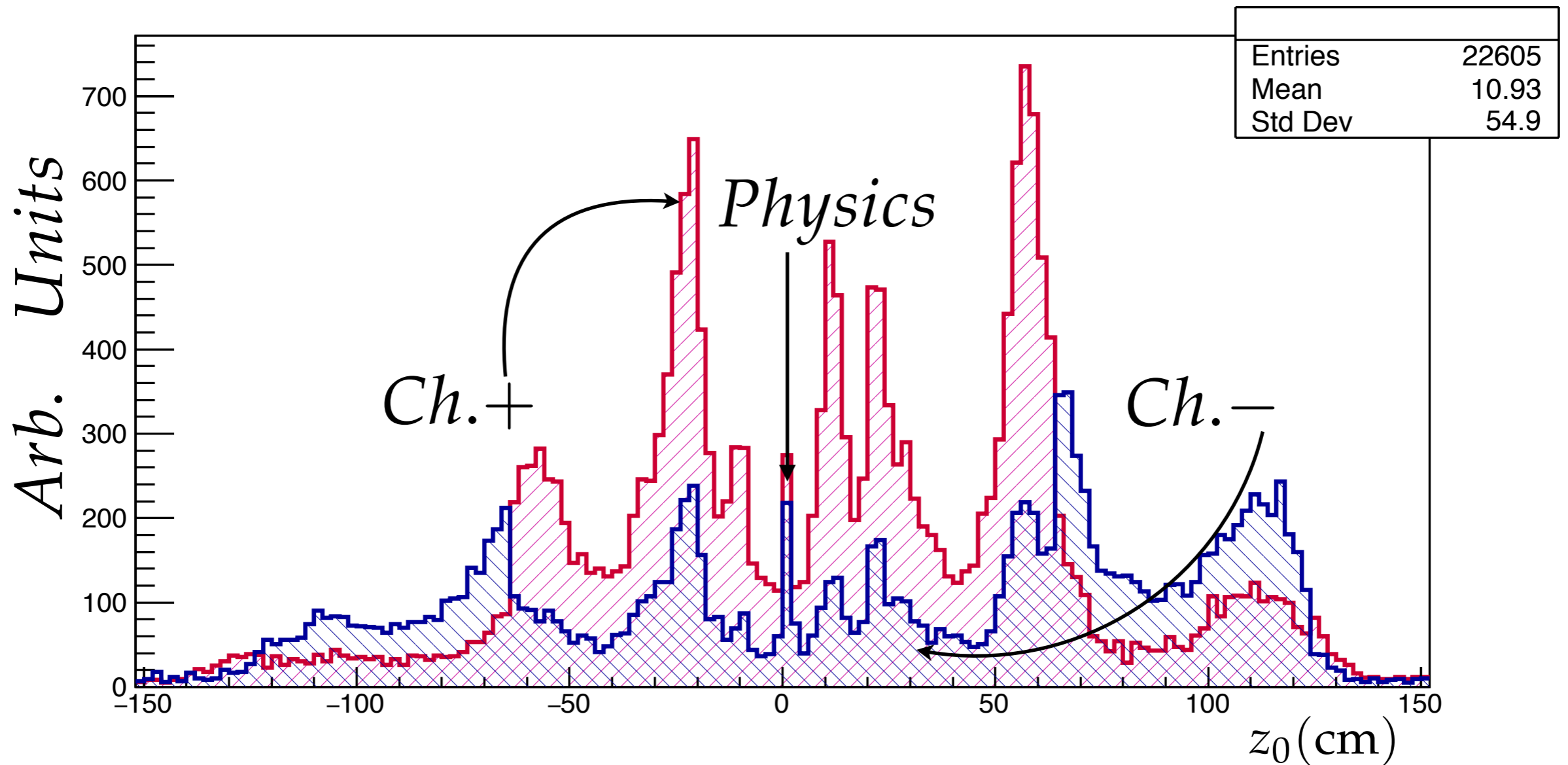


Some Preliminary Considerations

- ◆ Tracks are there both the CDC and from the SVD, but...
- ◆ Less than 1 track / event on average? Duh?
 - ◆ $Y(4S)$ average multiplicity 11
 - ◆ Bhabha multiplicity 2
 - ◆ What about beam background?

Longitudinal Distribution

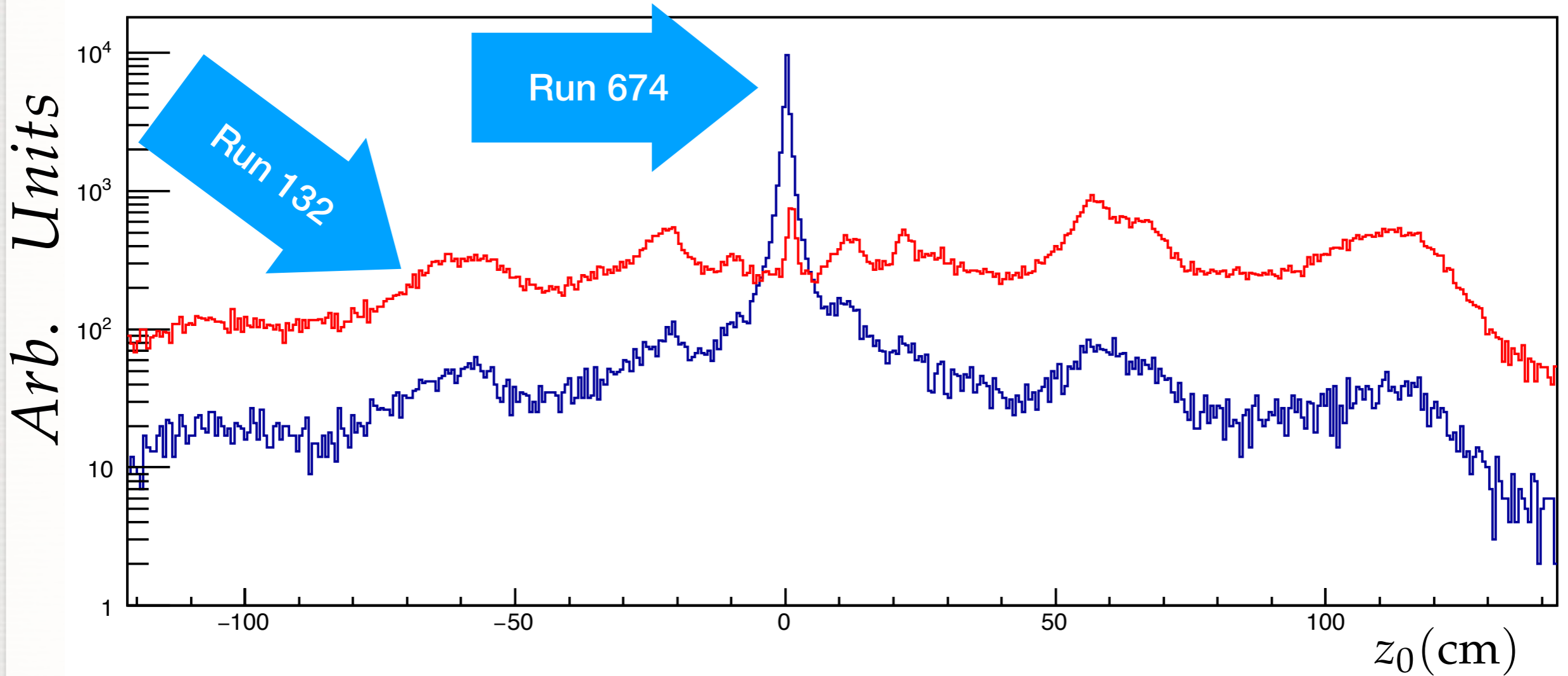
$z_0_estimate \{ \omega_estimate > 0 \ \&\& \ abs(d_0_estimate) < 2 \ \&\& \ abs(pt_estimate - .5) < .2 \}$



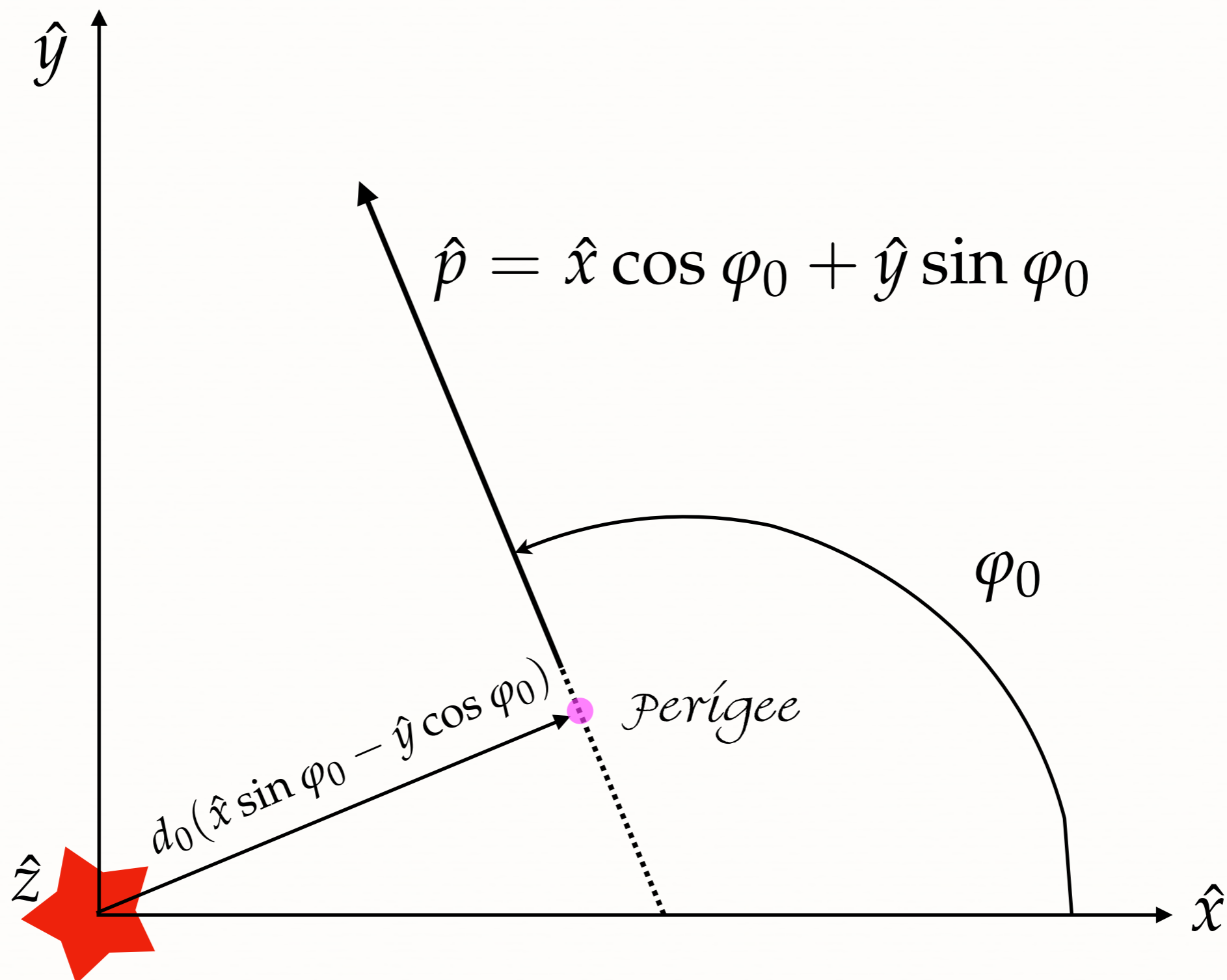
Runs 112-134 (April the 26th and 27th)

After Some Machine Tuning

$z_0_estimate \{abs(d_0_estimate) < 5\}$



Track Parameters: Transverse Plane

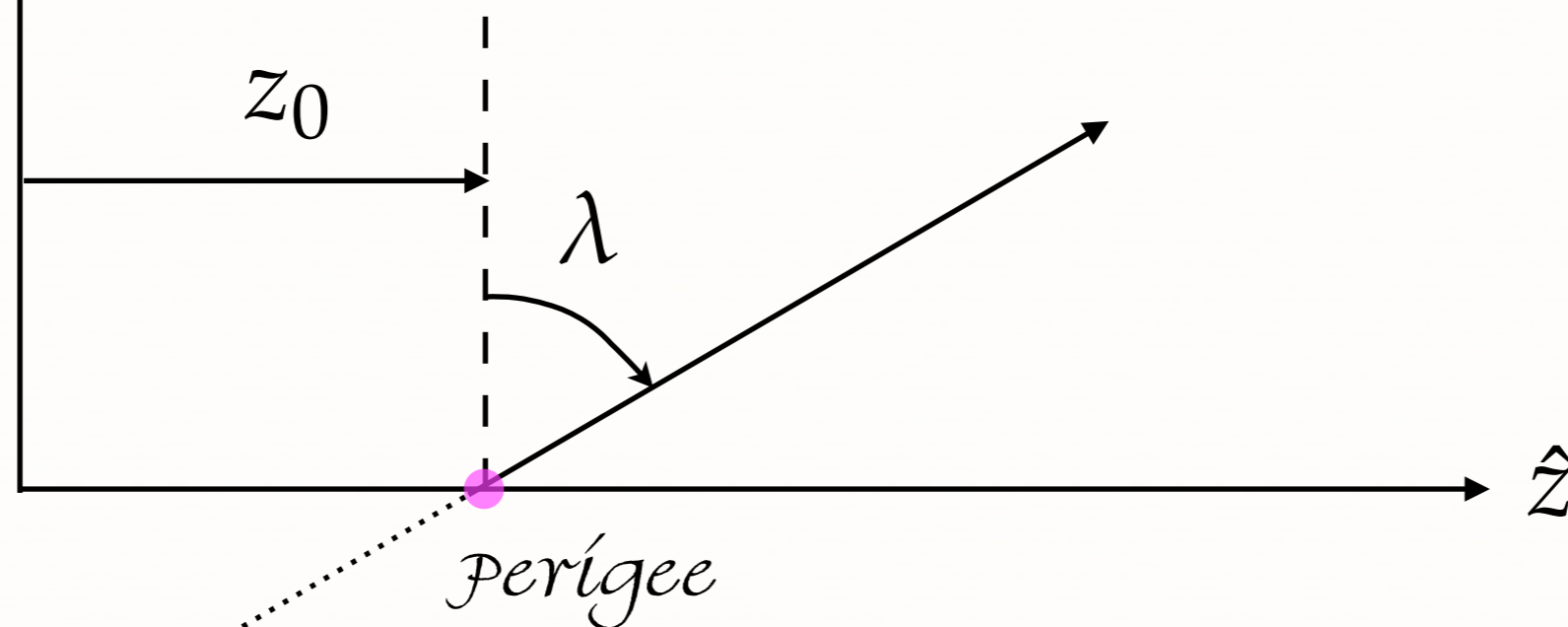


Track Parameters: Longitudinal Plane

$$\hat{p} = \hat{x} \cos \varphi_0 + \hat{y} \sin \varphi_0$$

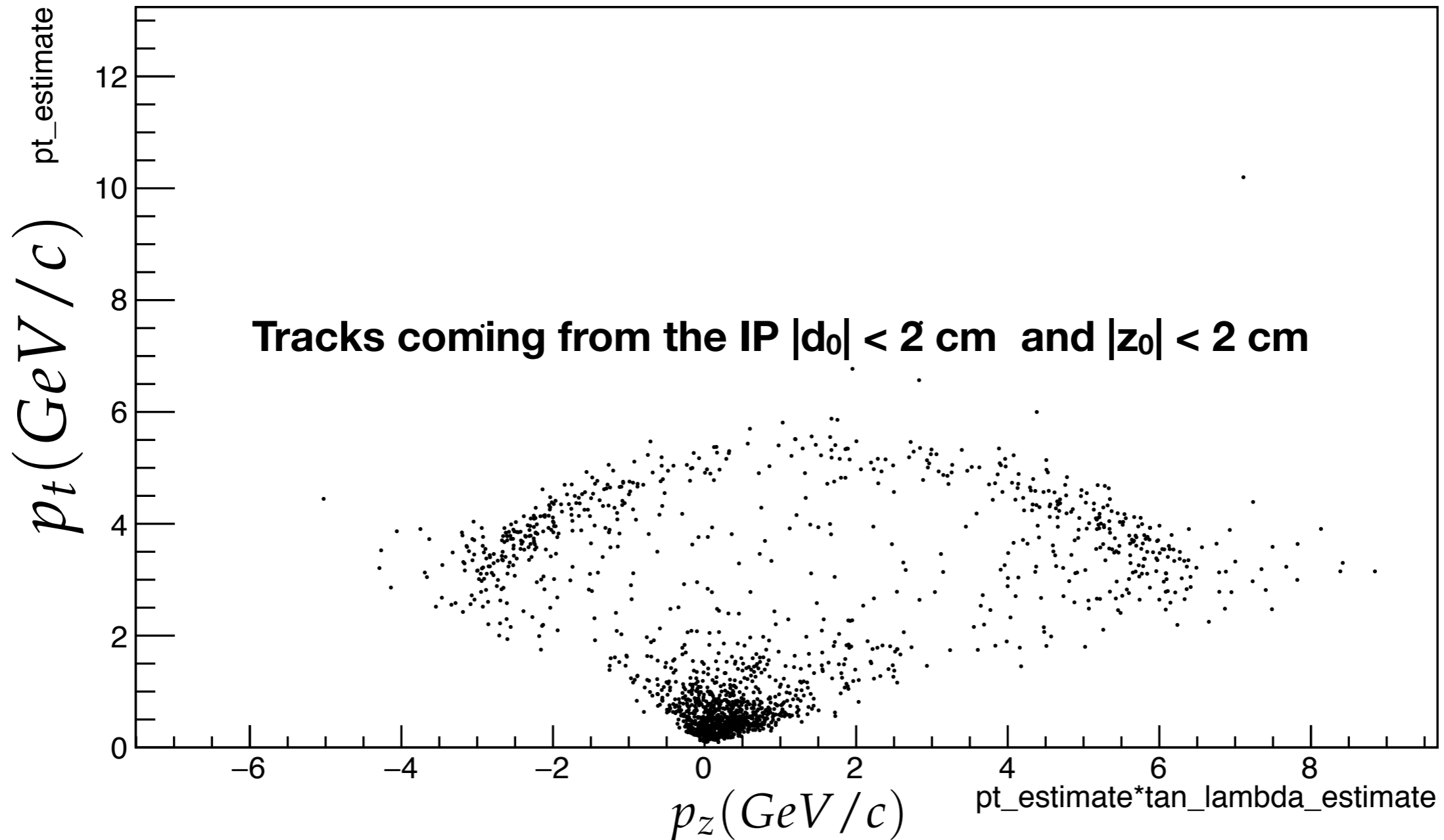
$$p_t = \frac{B_z q}{\omega} \quad \frac{p_z}{p_t} = \tan \lambda$$

$$\begin{cases} x = & d_0 \sin \varphi_0 + l \cos \varphi_0 \\ y = & -d_0 \cos \varphi_0 + l \sin \varphi_0 \\ z = & z_0 + l \tan \lambda \end{cases}$$



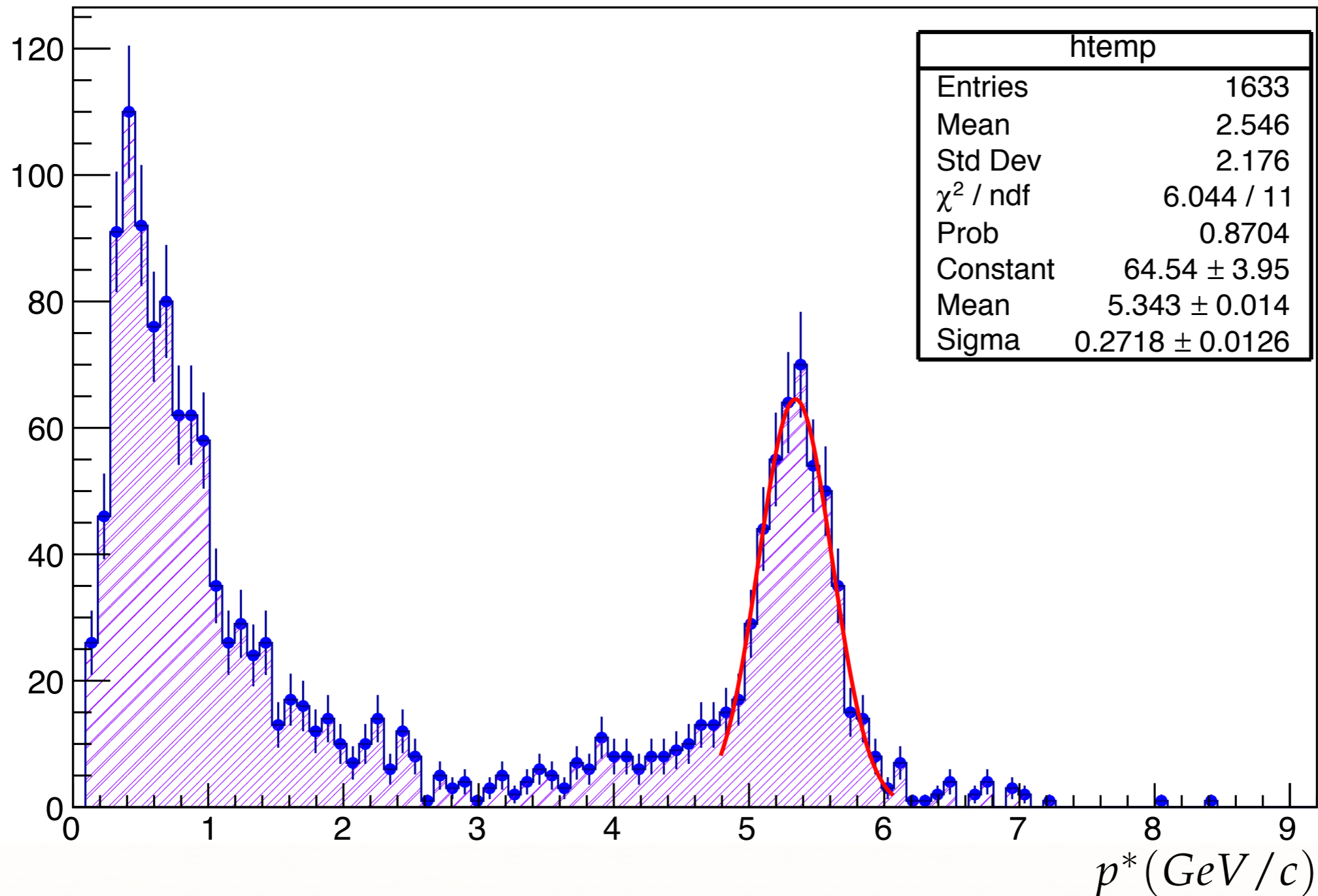
Bhabha's & Mu Pairs

pt_estimate:pt_estimate*tan_lambda_estimate {abs(d0_estimate)<.2 && abs(b_field*1e4-1.5)<.1 && abs(z0_estimate)<2 && abs(d0_estimate)<.5}

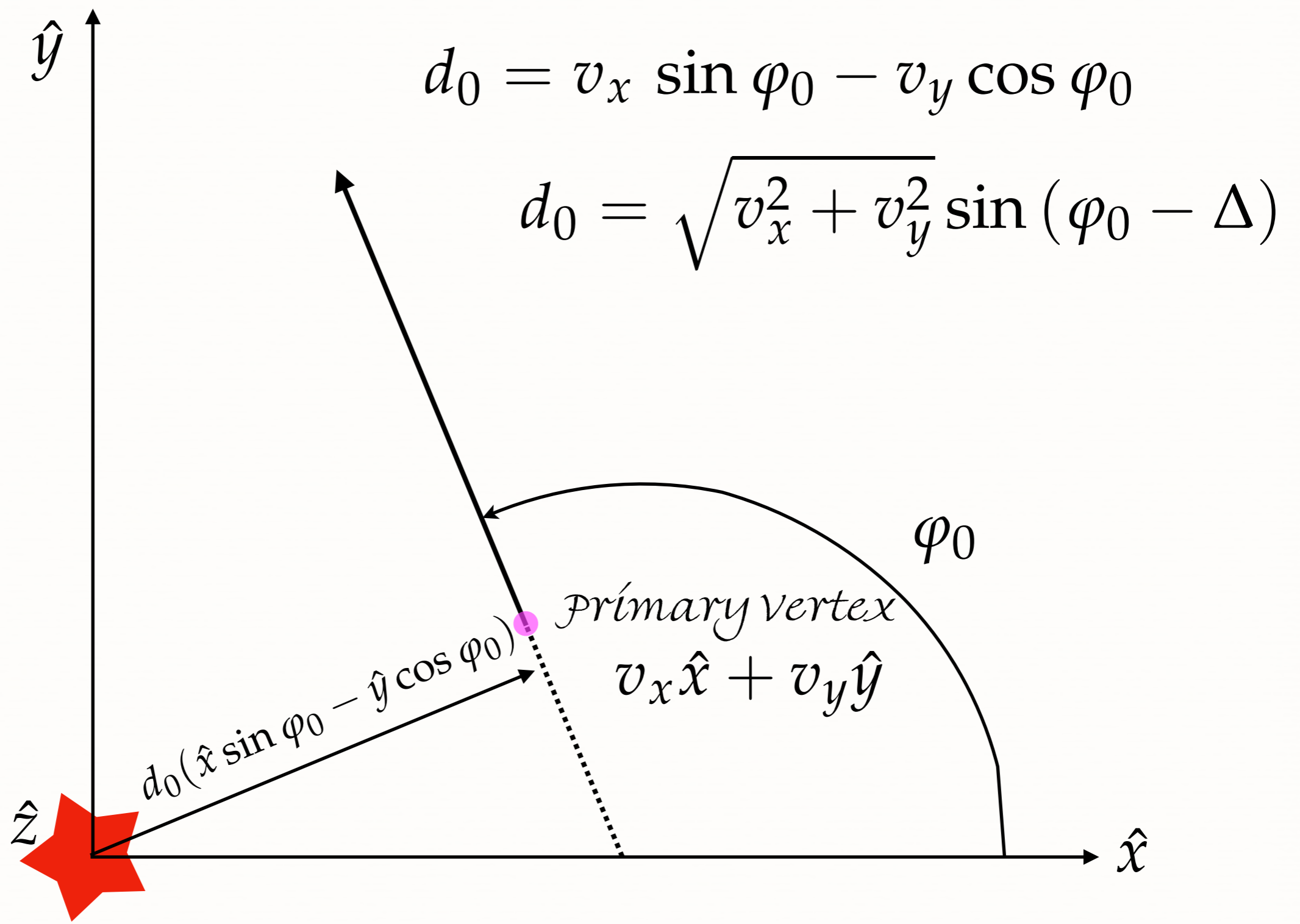


Bhabha's & Mu Pairs

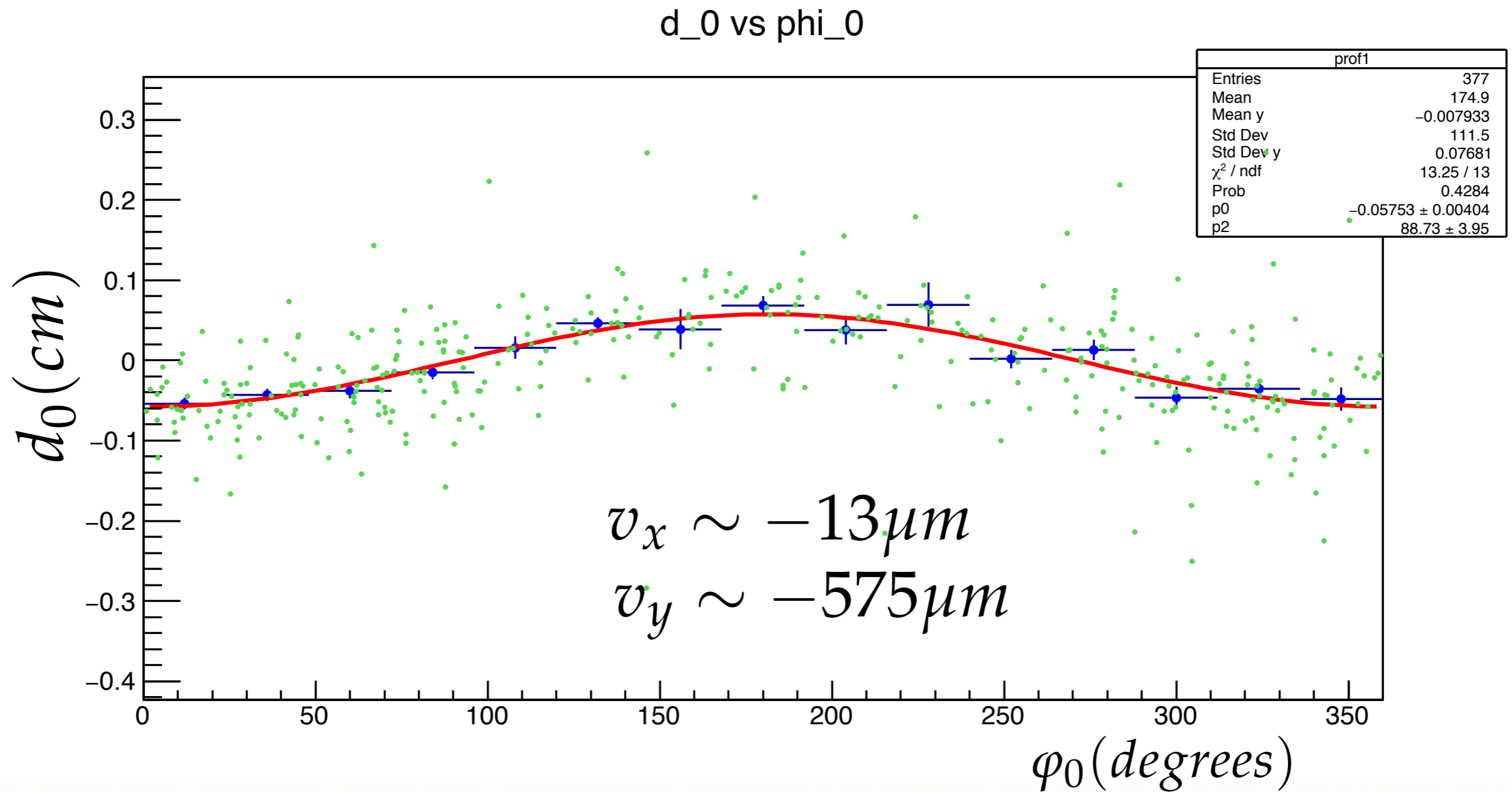
PP-.2836*pt_estimate*sqrt(1+tan_lambda_estimate**2)**2) {abs(d0_estimate)<.2 && abs(b_field*1e4-1.5)<.1 && abs(z0_estimate)<.2 && abs(d0_estimate)<.5 && pt_estimate<.7}



Track Parameters: Transverse Plane

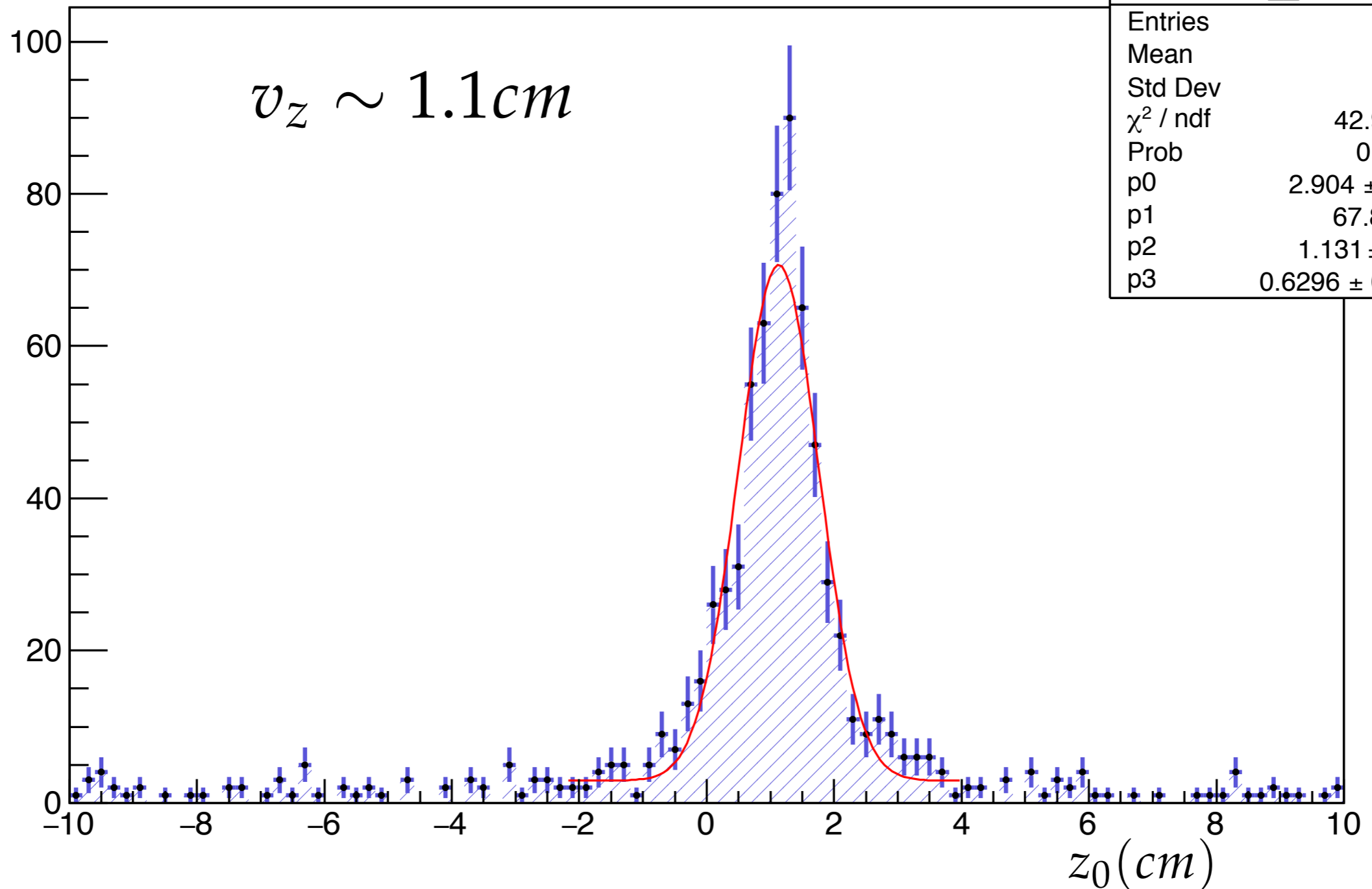


Beam Spot Position Determination



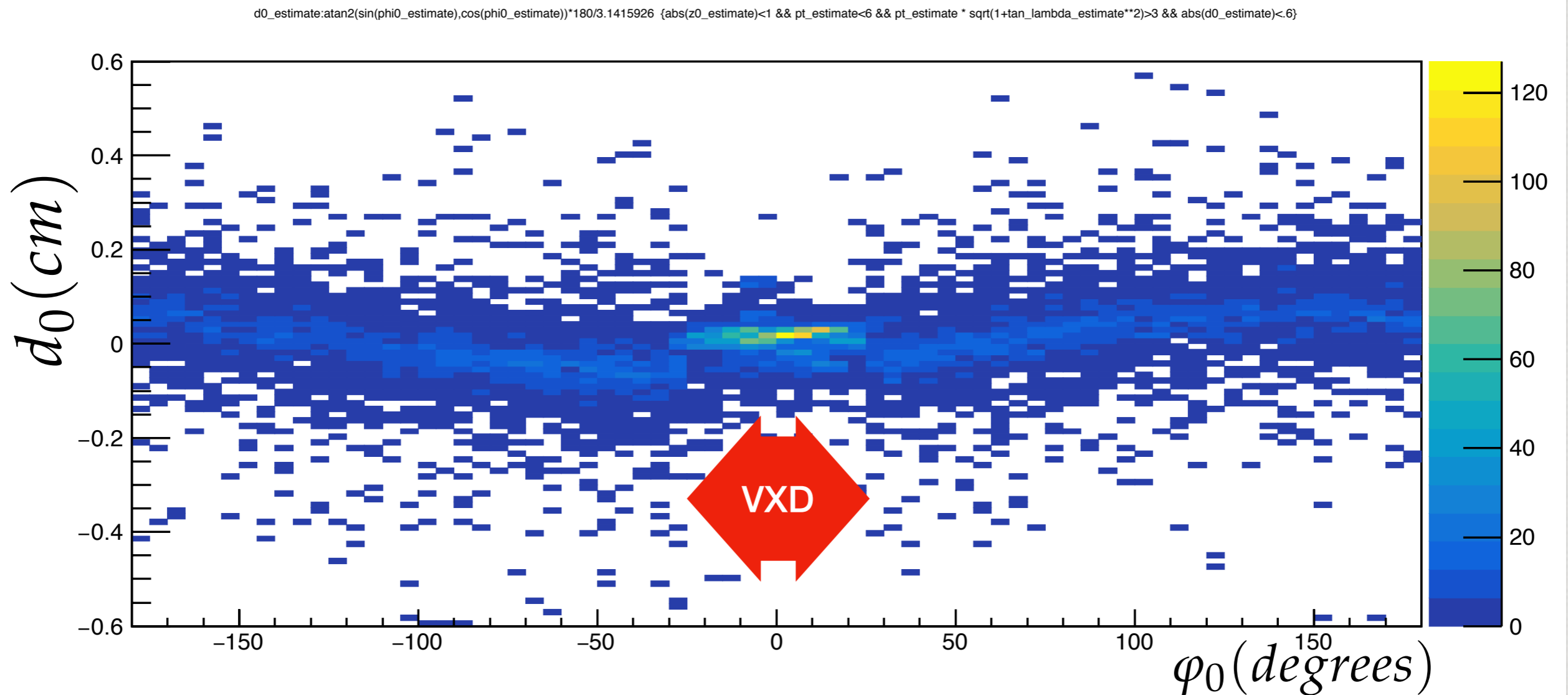
Beam Spot Position Determination

`z0_estimate {abs(d0_estimate)<.2 && abs(pt_estimate*sqrt(1+tan_lambda_estimate**2))>4}`



_1	
Entries	1364
Mean	0.847
Std Dev	2.628
χ^2 / ndf	42.93 / 27
Prob	0.02657
p0	2.904 ± 0.483
p1	67.8 ± 4.4
p2	1.131 ± 0.031
p3	0.6296 ± 0.0359

With A Larger Dataset

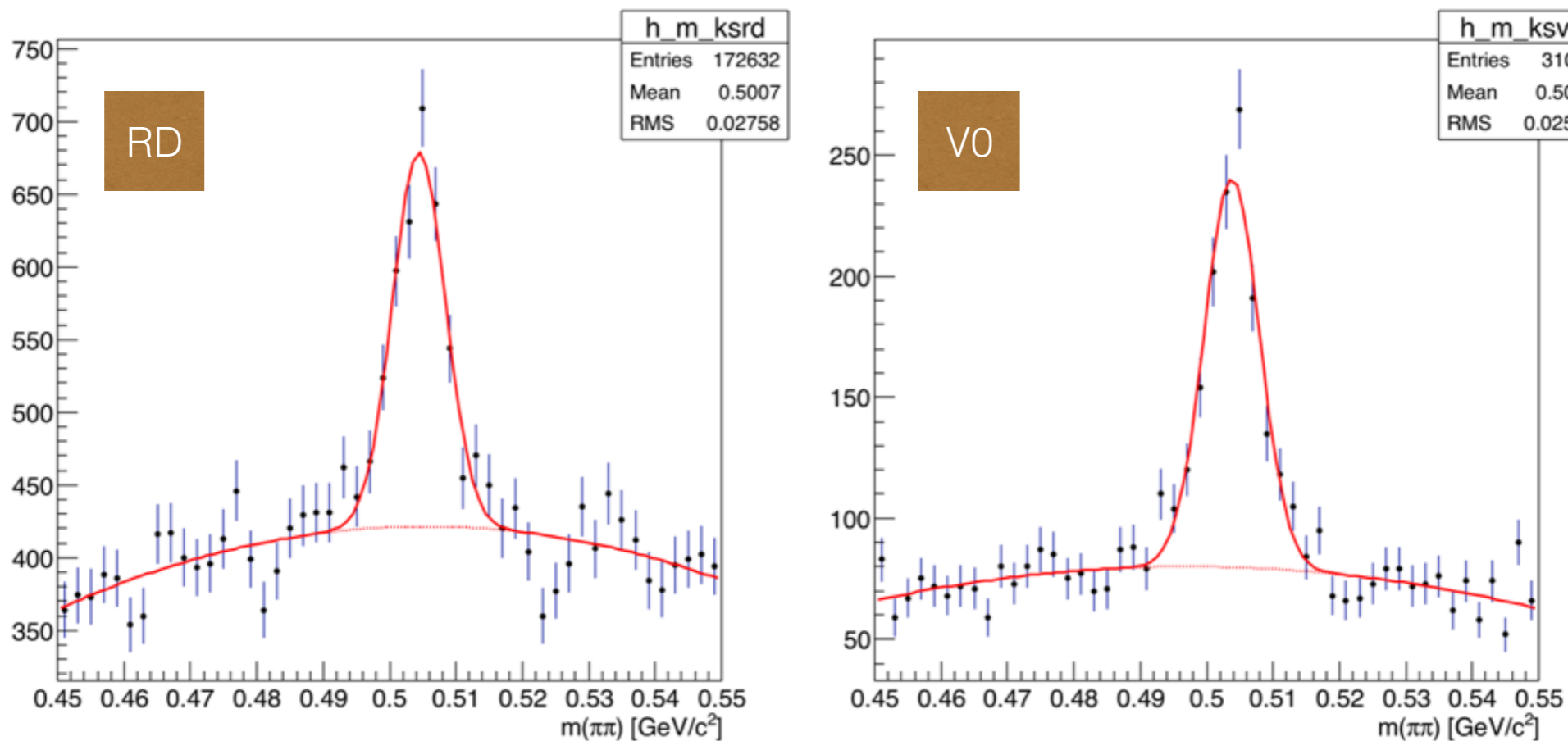


- ◆ We are adding the correct VXD hits to the tracks:
 - ◆ Improved resolution on d_0
 - ◆ Vertical misalignment among VXD and CDC (order of a few hundreds microns)

We Do Have K_S

K_S candidates

- cuts: $nTr > 2$ && $|z0_d| < 15$ cm

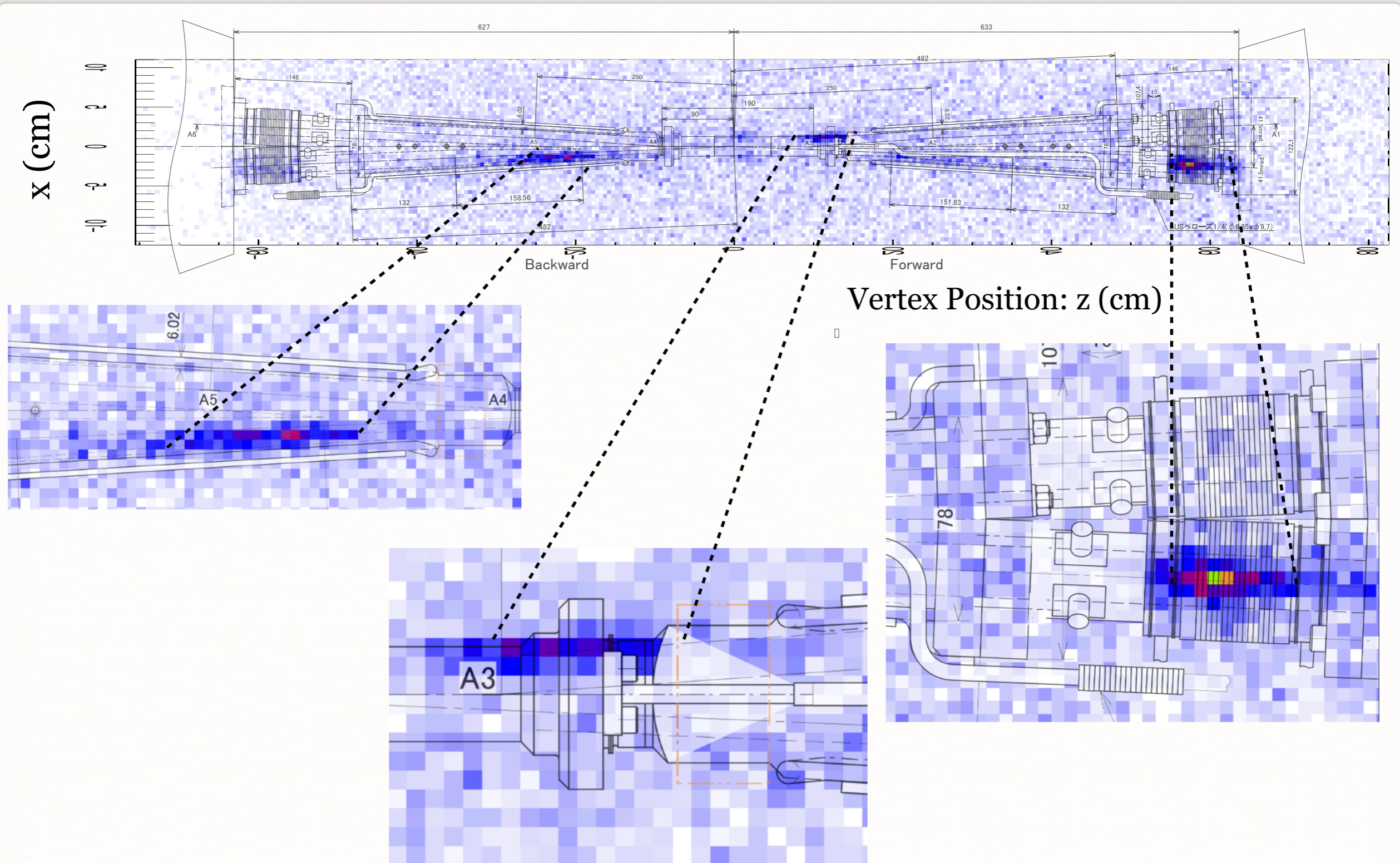


	μ [MeV/c ²]	σ
V0	503.8 ± 0.2	4.1
RD	504.4 ± 0.3	3.9

PDG mass:
497.6 MeV/c²

B.Scavino

Among Other VOS From Machine Bkg.



Tracking Group Organization

- ◆ Martin Heck: Tracking Group Co-Convener left the High Energy Field last week
 - ◆ Sasha Glazov (DESY) took over Martin
- ◆ Nils Braun is going to get his PhD and then leave the HEP field
- ◆ Oliver Frost, Jakob Lettenbichler, Tobias Schlüter already did
 - ◆ Core developers are quickly fading away

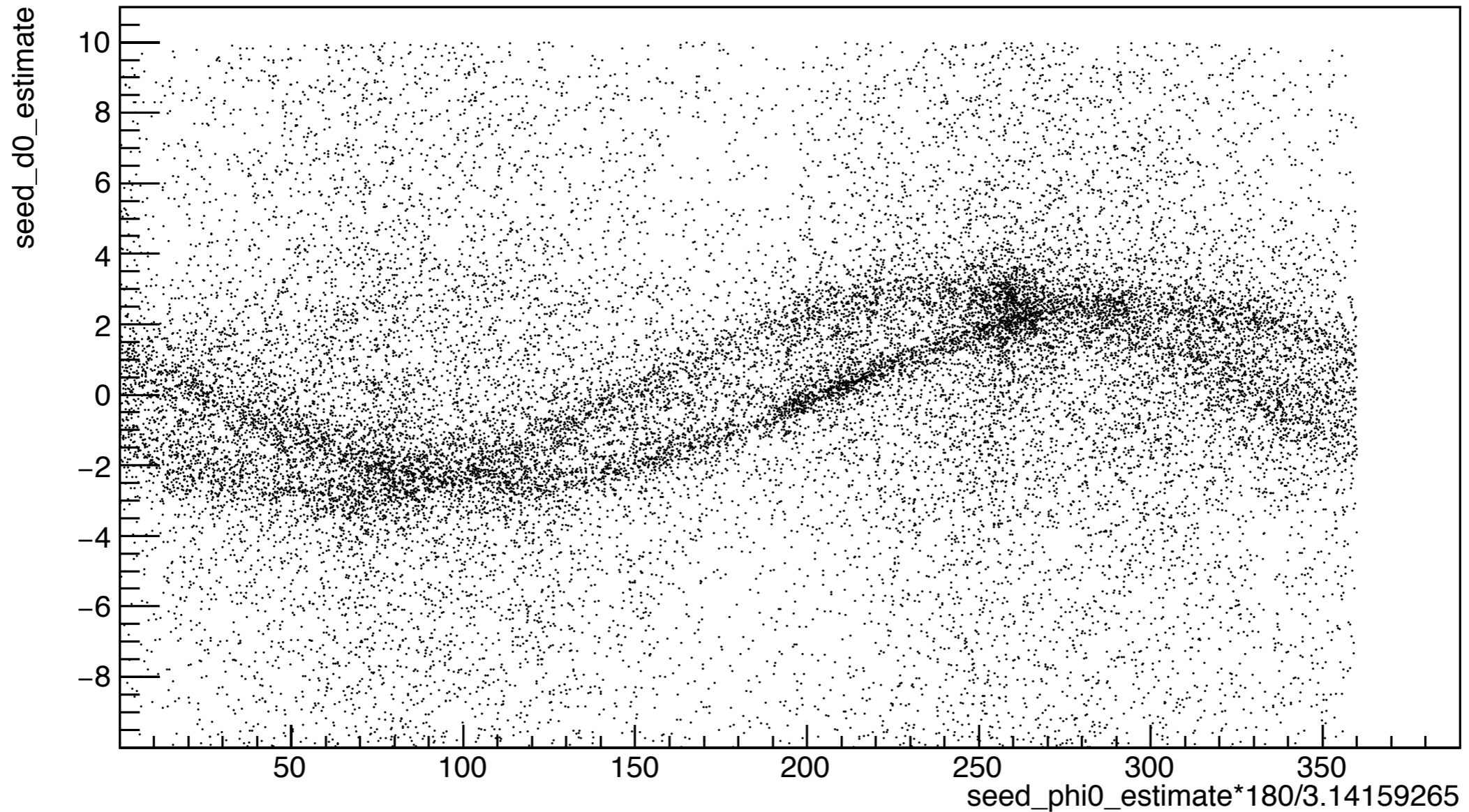
Conclusions

- ◆ The tracking code is working very fine
- ◆ We have to characterize its performances:
 - ◆ Efficiency (Bhabha, mu pairs, $\tau\tau$, D^* studies)
 - ◆ Resolution (Bhabha, mu pairs, τ pairs, K_s , D^* etc...)
- ◆ We have to tune here and there some parameter
 - ◆ Alignment (Tadeas + Jakub)
 - ◆ SVD timing (proposal: Pisa)
 - ◆ CDC calibration constants (proposal: Desy + KEK)

Bonus Plots

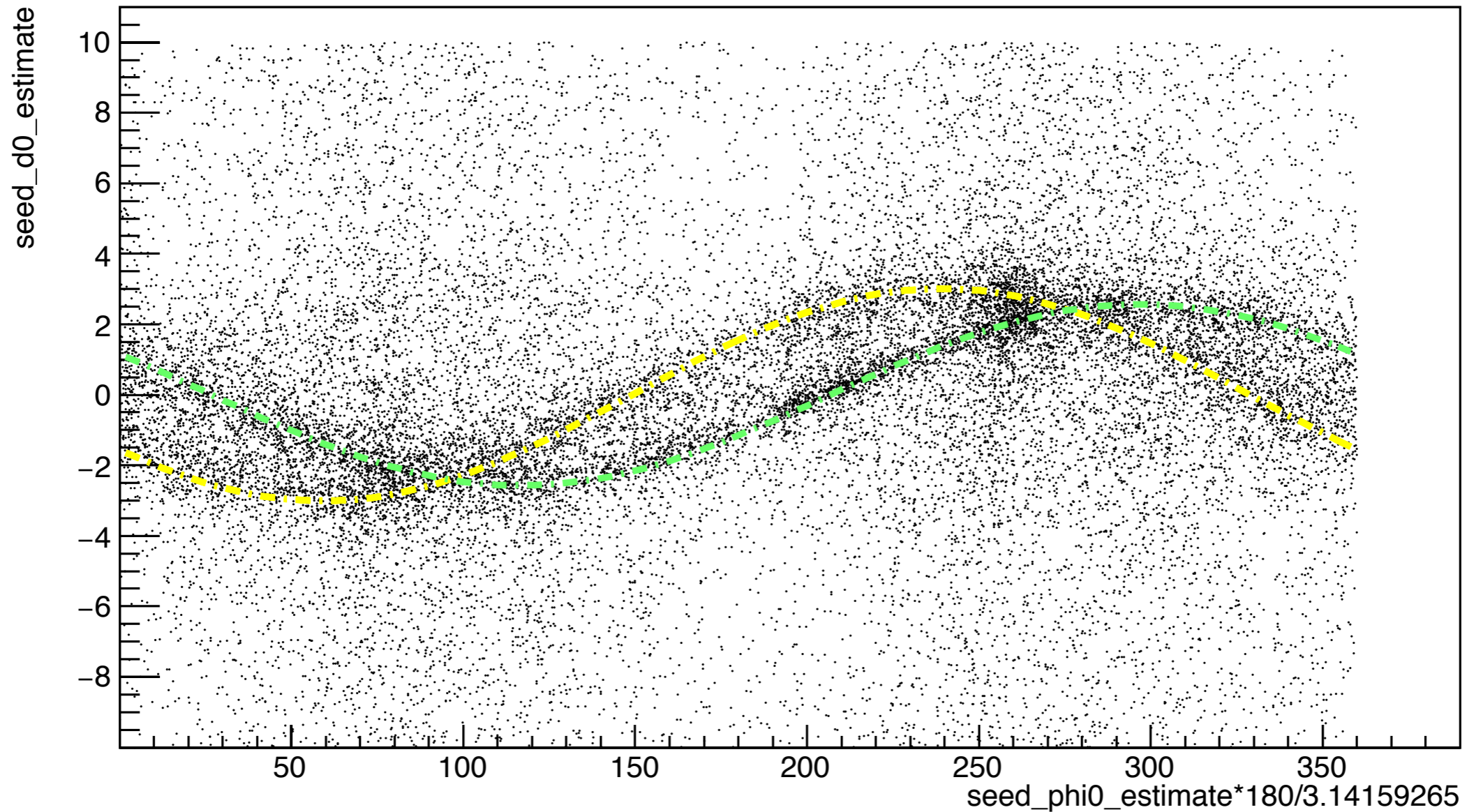
D0 Vs Phi0 Background

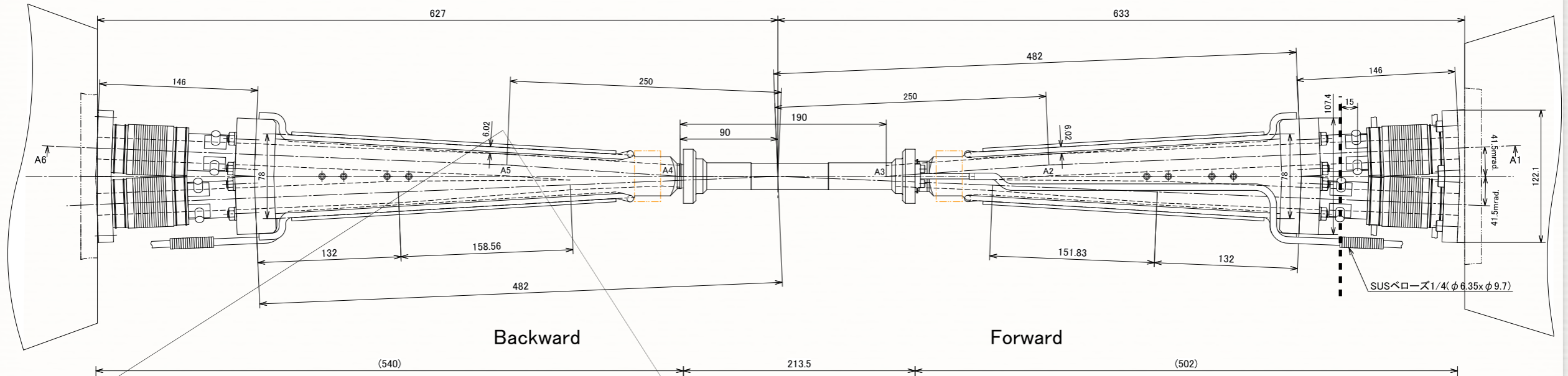
seed_d0_estimate:seed_phi0_estimate*180/3.14159265 {abs(seed_z0_estimate-56)<10 && abs(seed_d0_estimate)<10}



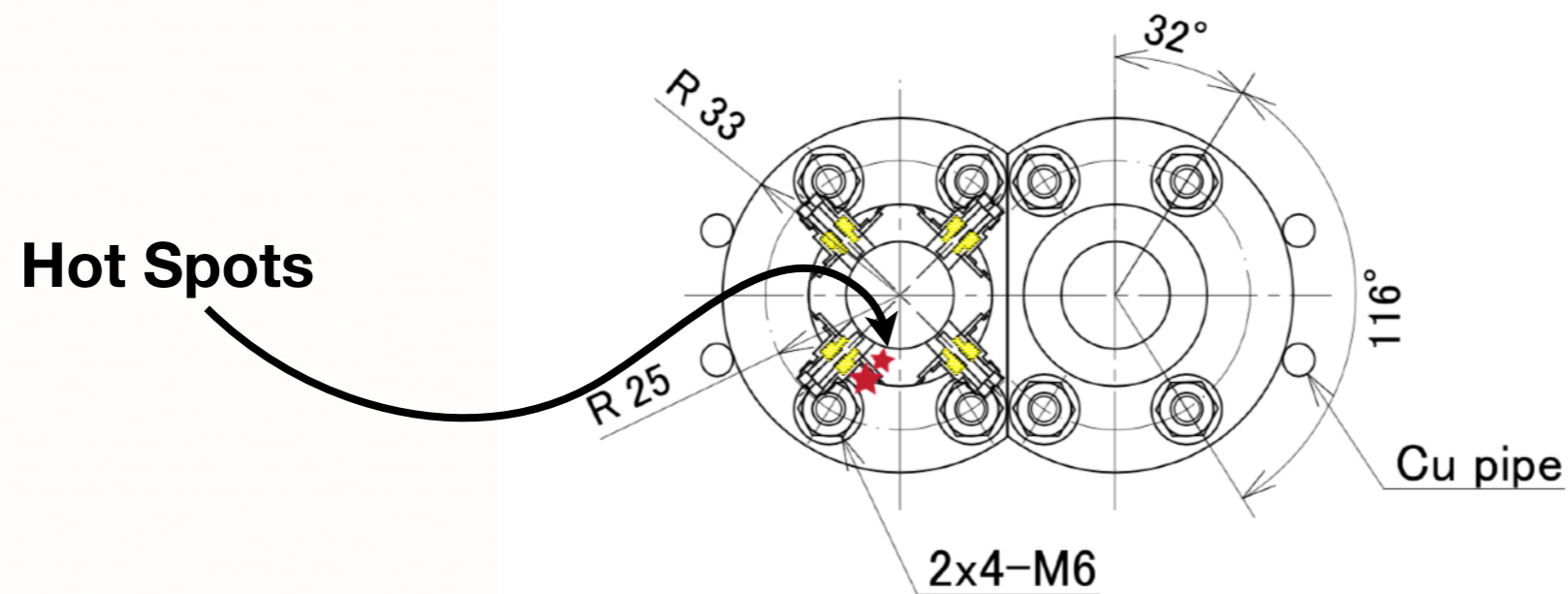
D0 Vs Phi0 Background

seed_d0_estimate:seed_phi0_estimate*180/3.14159265 {abs(seed_z0_estimate-56)<10 && abs(seed_d0_estimate)<10}





Section C-C



Conclusions

- ◆ The tracking is working quite well since the start of collisions
- ◆ We can provide a first estimate of the IP position
- ◆ The CDC + tracking is a marvelous background detector, things will improve from the machine side
 - ◆ soon hopefully...
- ◆ We can also provide useful information to the machine people right now
- ◆ Work in progress to train the sector map on the displaced IP