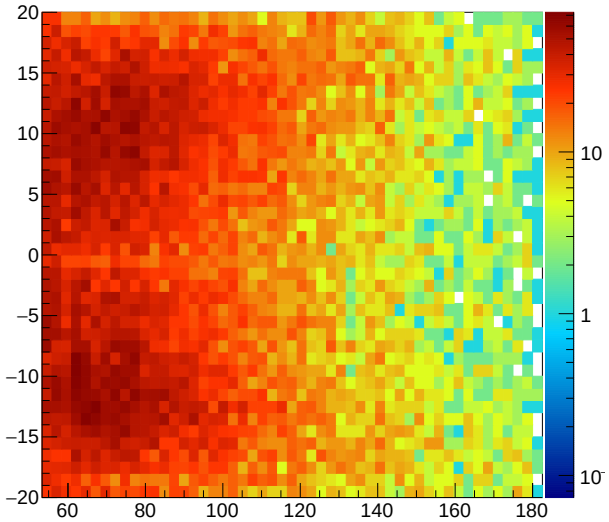
Johannes Giarra (JGU Mainz)

31.03.2017

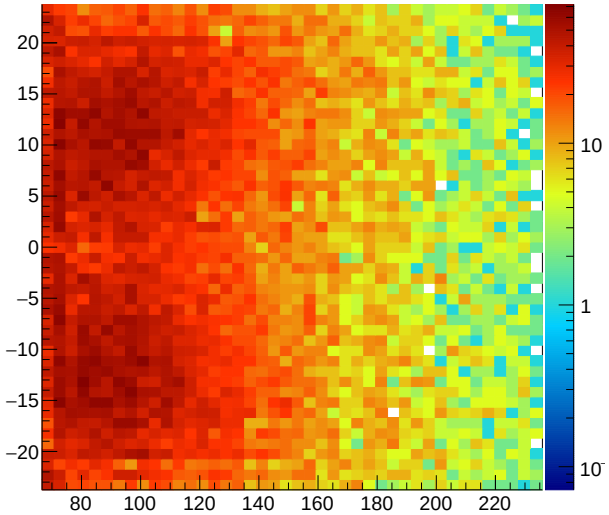
First: claim that there is something wrong with Ladder trigger

2012

h_HL04X1_m_1

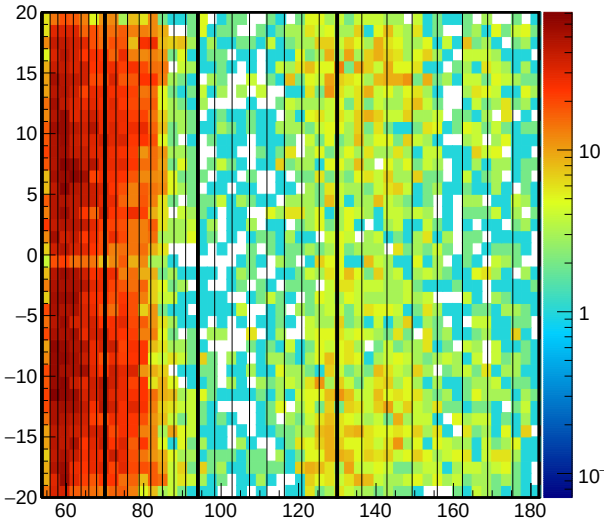


h_HL05X1_m_1

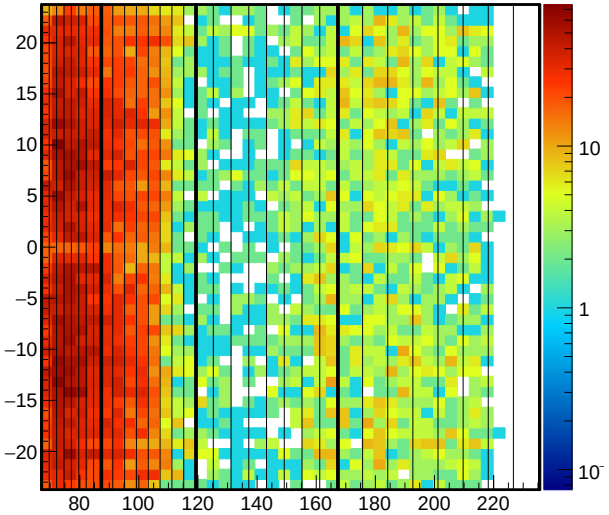


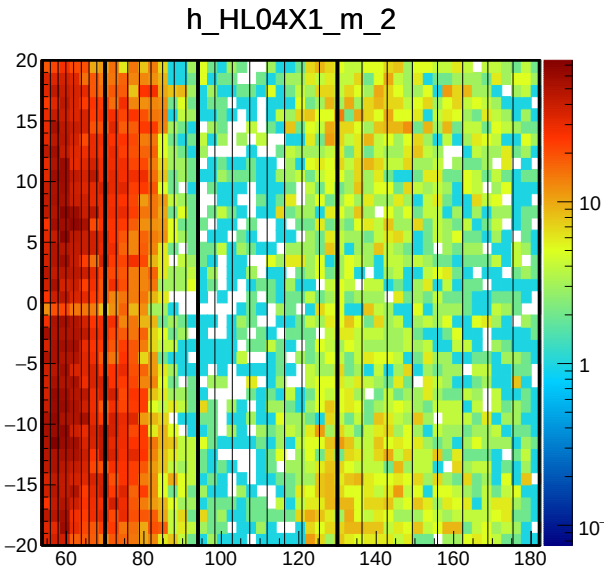
2016

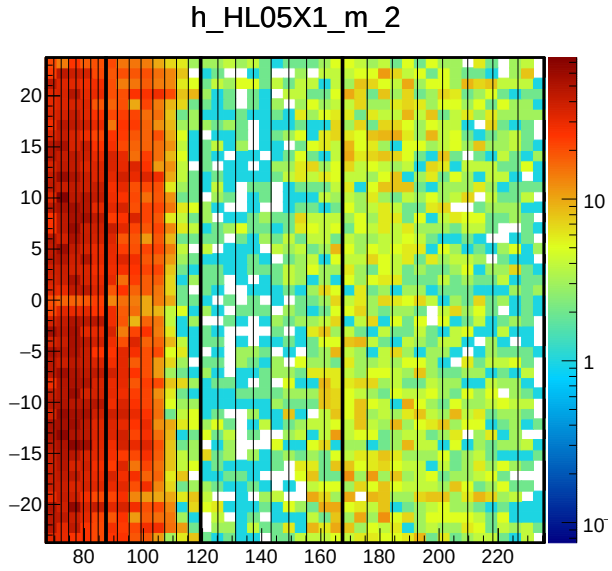
h_HL04X1_m_2



h_HL05X1_m_2







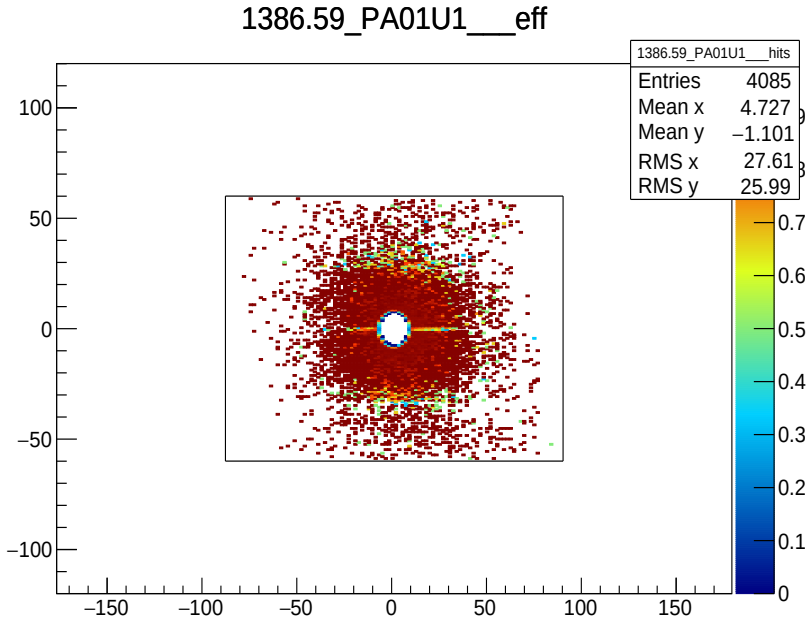
Also seen in extrap. CT tracks $\Rightarrow$ not a problem of ladder trigger

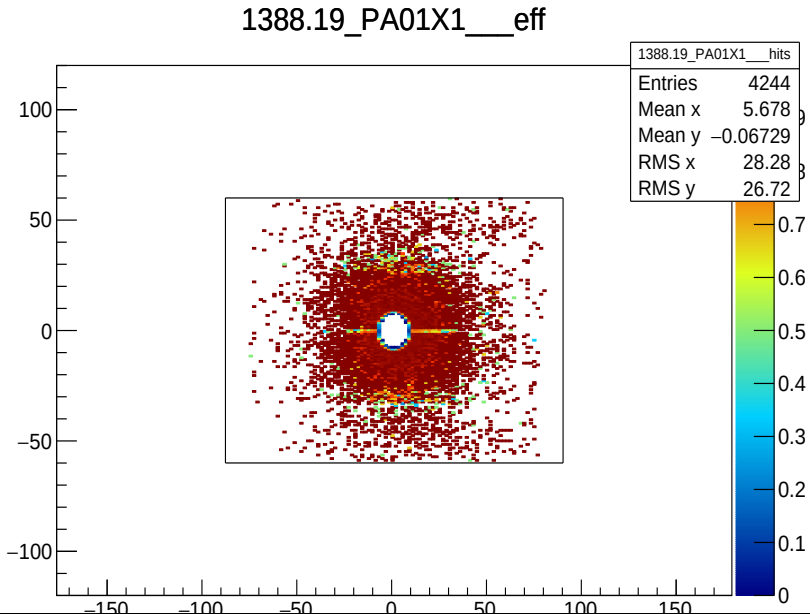
Performance check of spectrometer
$\rightarrow$ 2d pseudo efficiencies

$$\text{pseudo efficiencies} = \frac{\text{hit distribution}}{\text{extrapolated track dist.}}$$

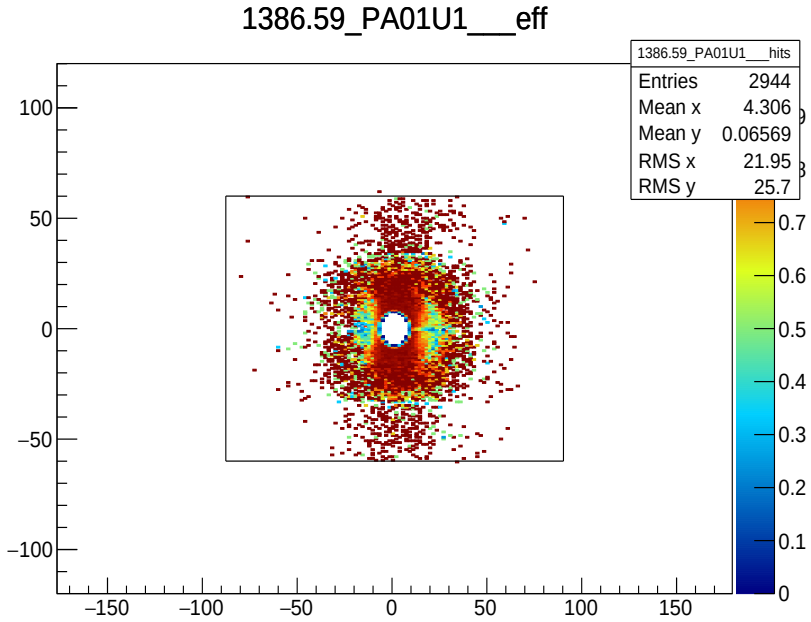
Pitch of MWPC was wrong

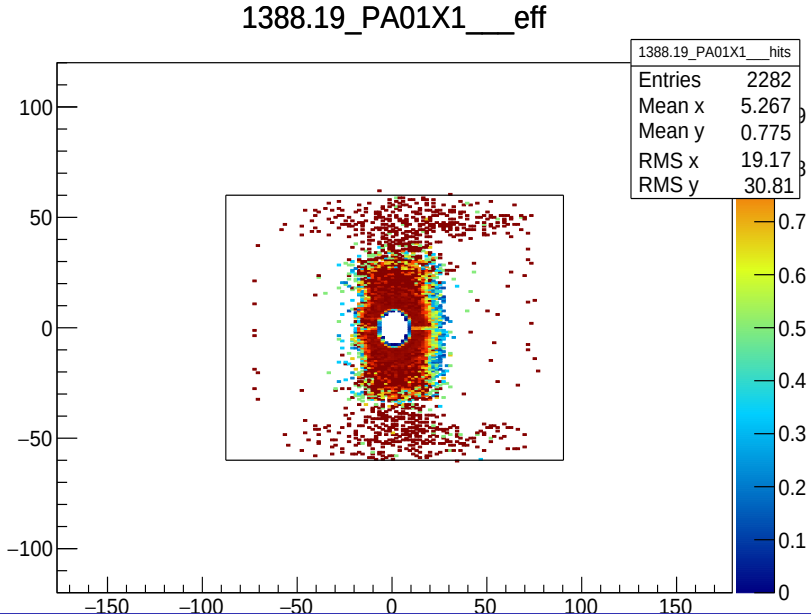
New data:



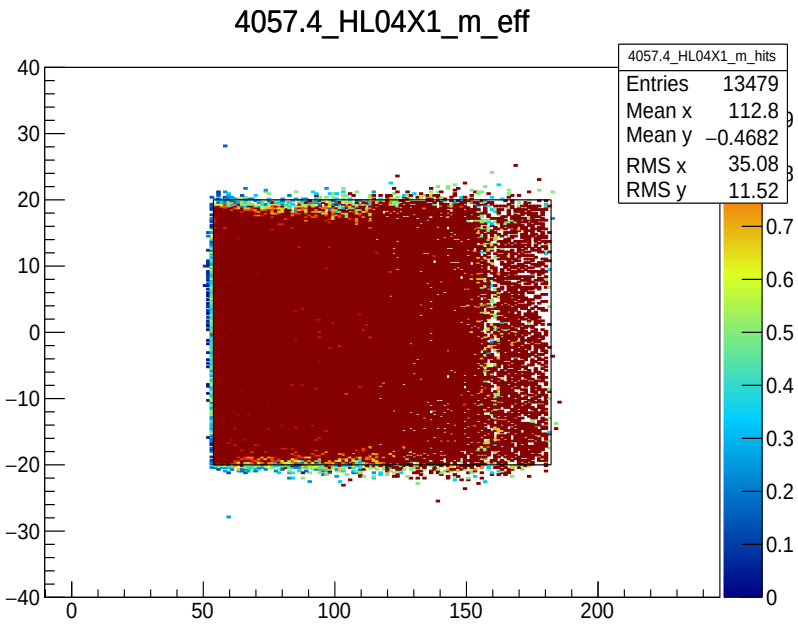


Old data:





New data:



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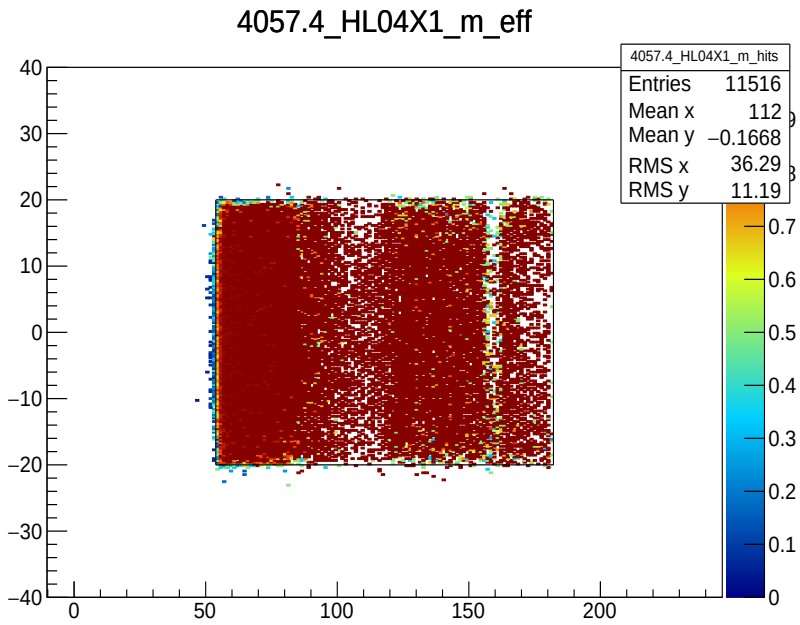
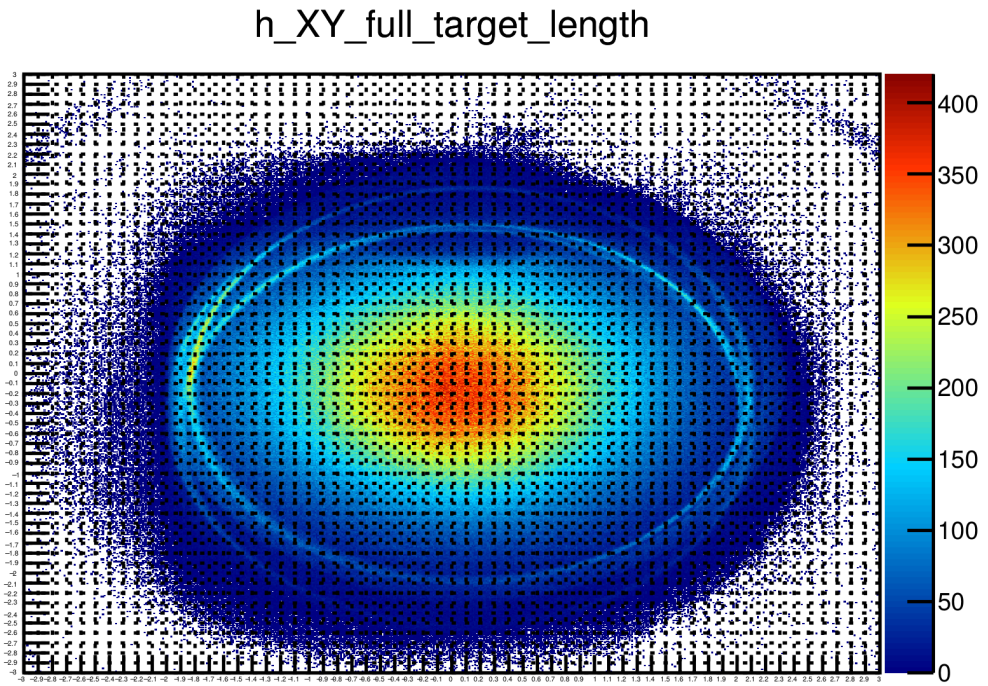


Another Topic: determination of target position

Why? Because usually the reference frame of spectrometer $\neq$ reference frame at target center

- Use: target density $<$ density of target cell material
  $\Rightarrow$ data selection to get vertex distribution in target area



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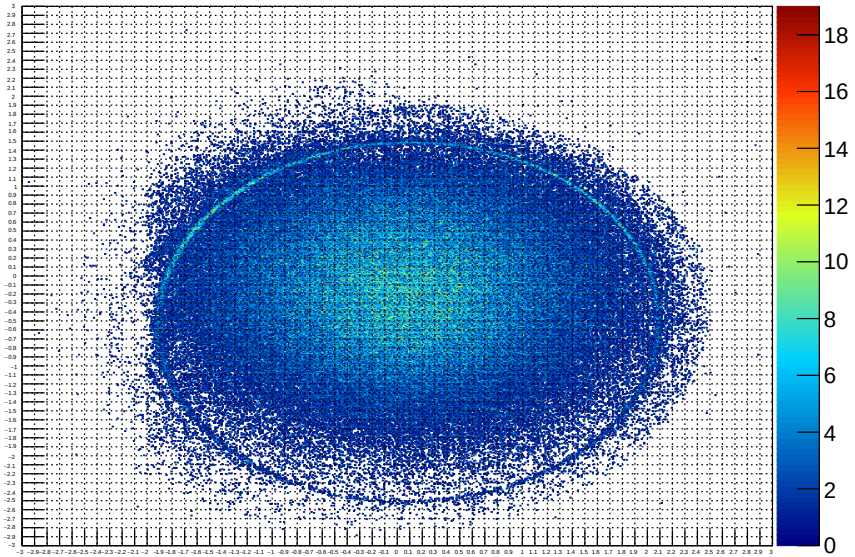
  $(-318.5\mathrm{cm} \leq l_{target} \leq -78.5\mathrm{cm})$



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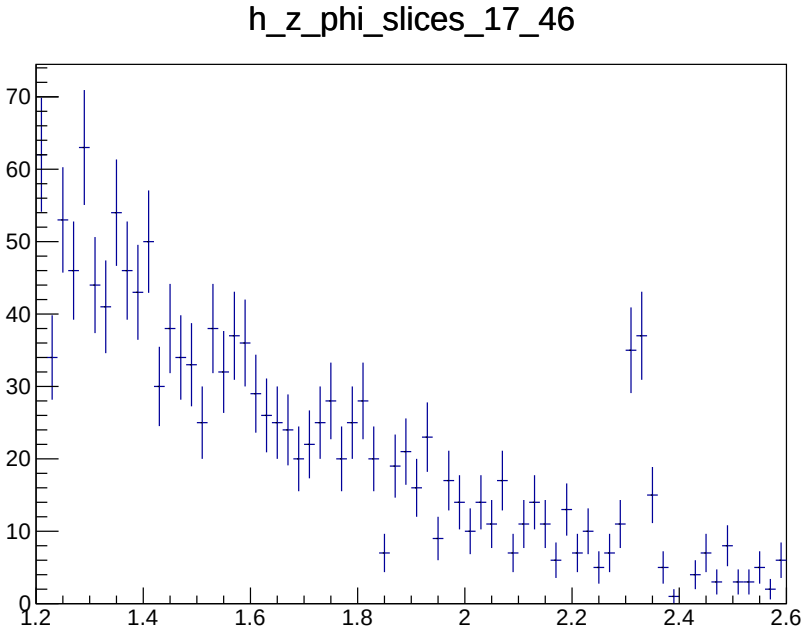
  72 angle bins ($\Delta\phi = 5$)



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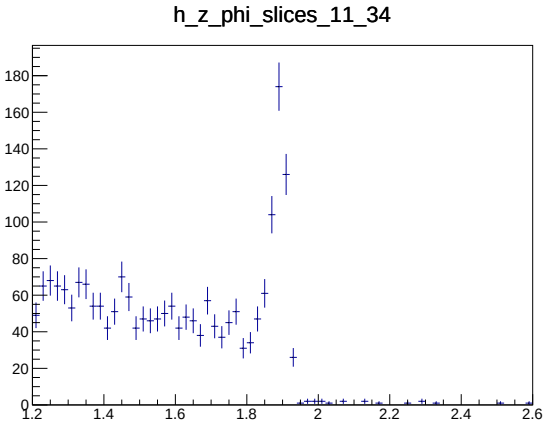
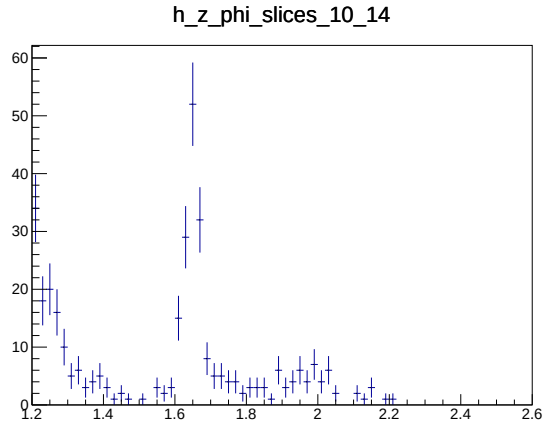
  72 angle bins ($\Delta\phi = 5$)

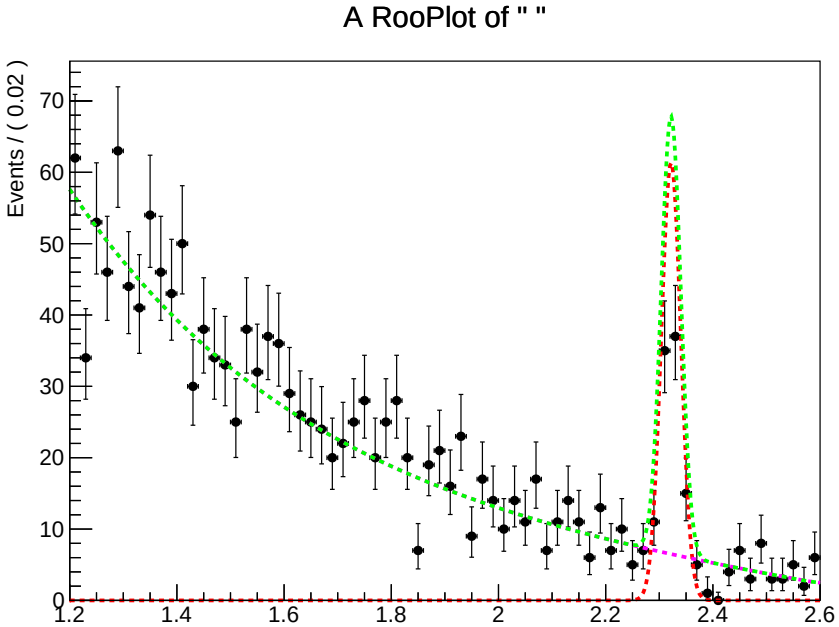
- Search the peak and fit its position
  $\rightarrow$ not that trivial because e.g different background contributions

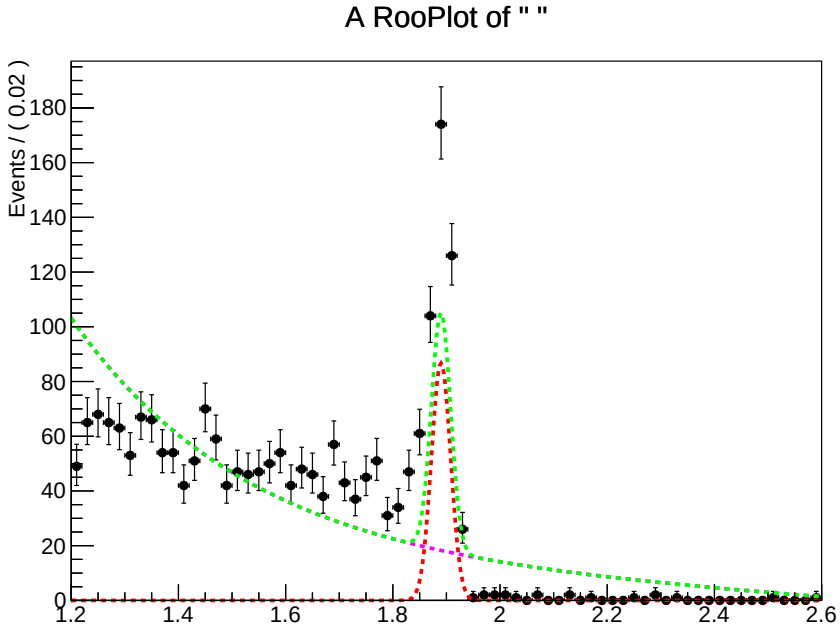




Finding the peak:

- **Peak:** Gauß **Background:** linear function + exp. function





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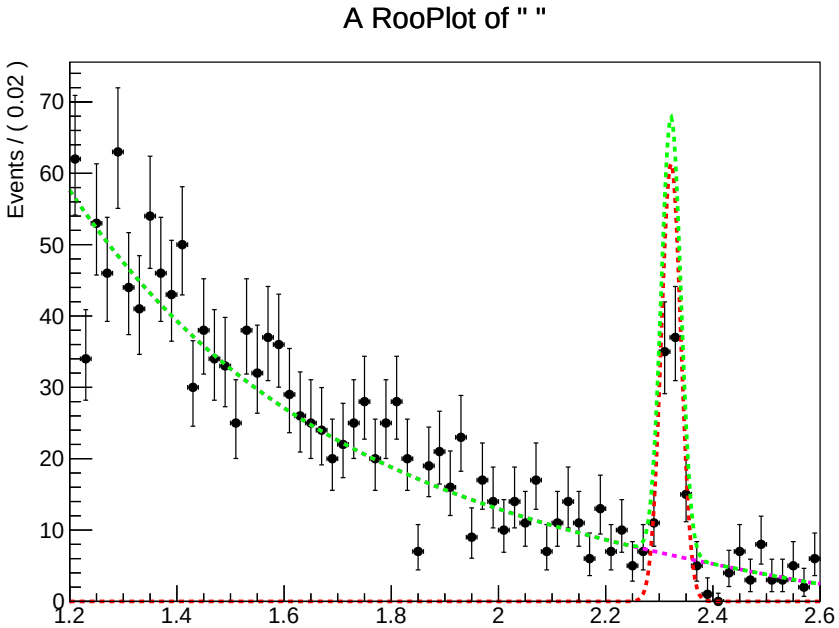
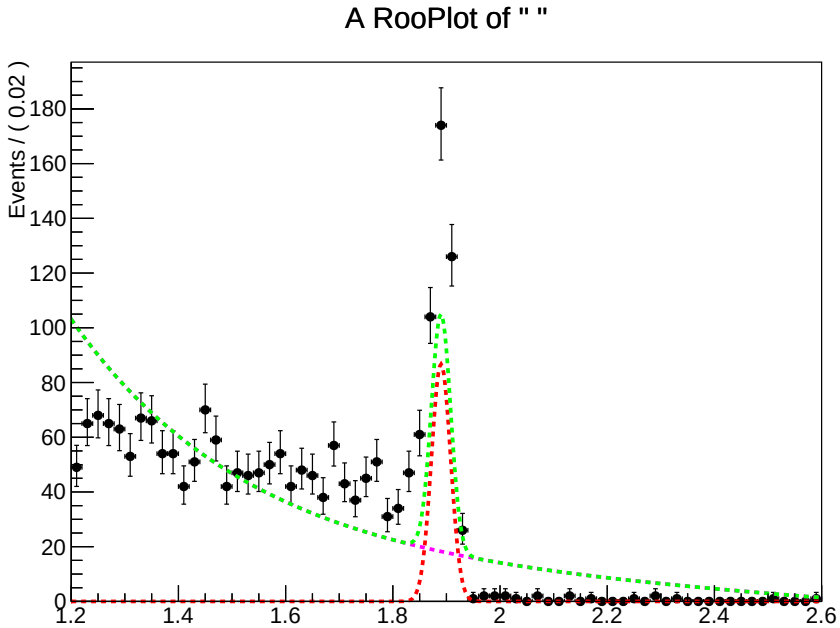
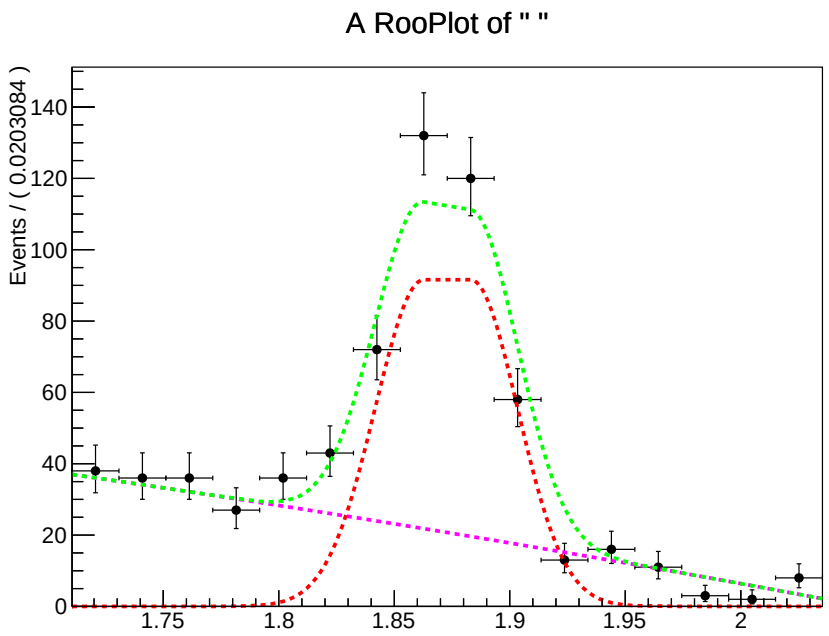




- Peak is found $\rightarrow$ slighly cut the edges around peak
  $\Rightarrow$ only peak surrounding for additional fit

Fit the peak:

- Expectation of target cell: rectangular function
  Real $\rightarrow$ because of e.g. binning smearing of edges of rectangual function
  $\Rightarrow$ modified function by defining edges as parts of gaußfunction(s)
  Background: linear function sufficient



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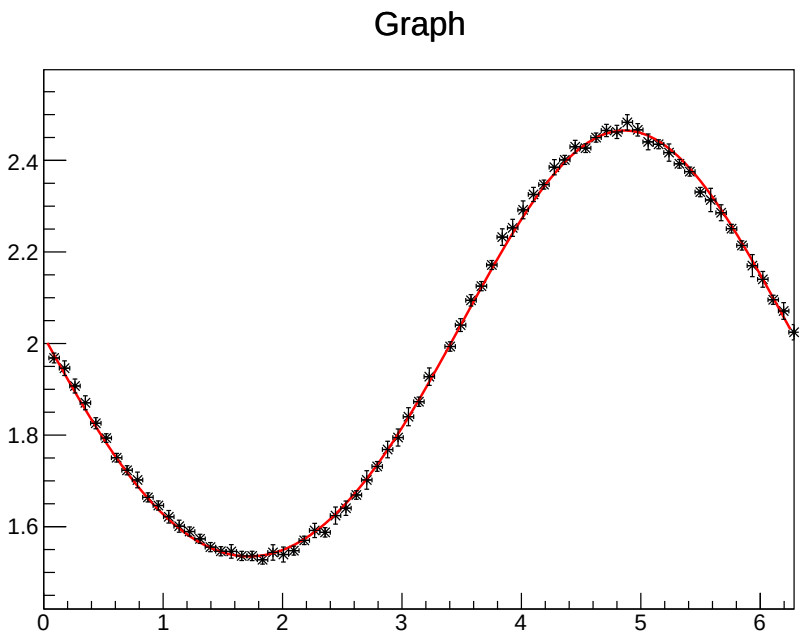
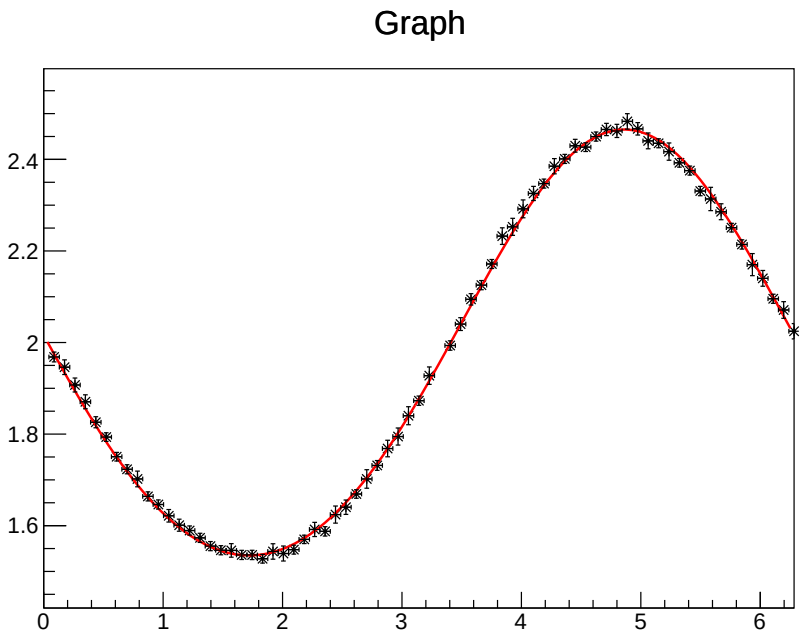
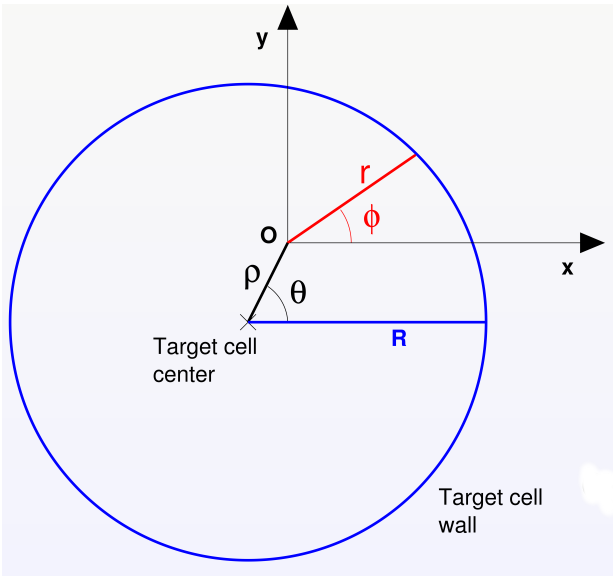
$\Rightarrow$ different values for radius of target cell (in spectrometer frame) for each angle bin

- Plot radii to ϕ dependency for each Z-slice

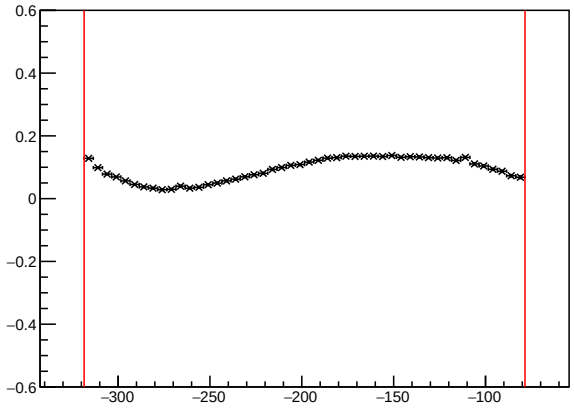


- Plot radii to ϕ dependency for each Z-slice
- Fit modulation with $r = -\rho \cdot \cos(\phi - \theta)\sqrt{(\rho \cdot \cos(\phi - \theta))^2 + R^2 - \rho^2}$
  (assumption that target frame $\neq$ spectrometer frame, target cell is round)

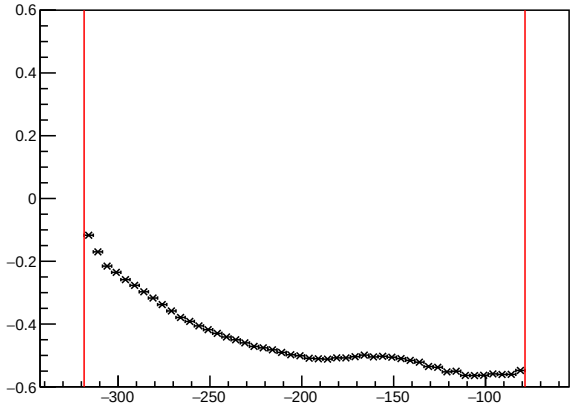




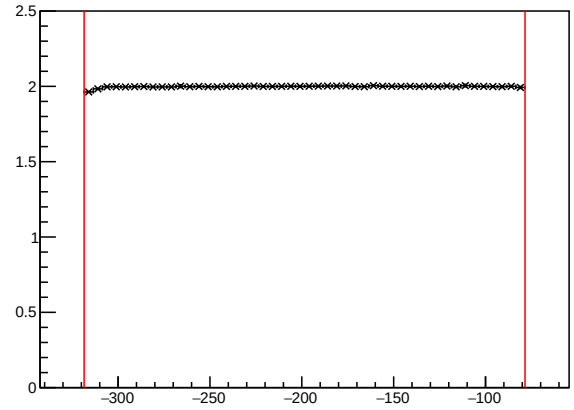
X-Z


0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−300
−250
−200
−150
−100

Y-Z


0.6
0.4
0.2
0
−0.2
−0.4
−0.6
−300
−250
−200
−150
−100

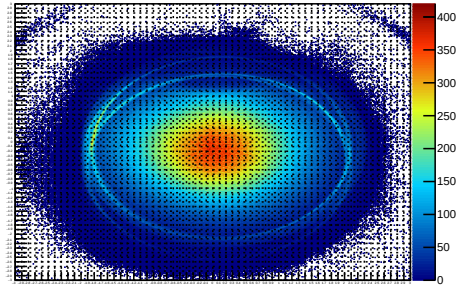
R-Z


2.5
2
1.5
1
0.5
0
−300
−250
−200
−150
−100

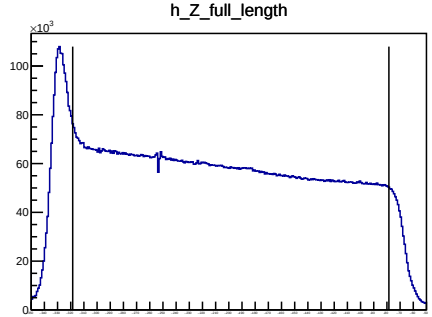
Applied target cut:

C++ function: reads modulation fit results for each Z-slice (R, ρ, θ)
$\rightarrow$ calculating r for certain ϕ (angle of particle position in X-Y-plane)
$\Rightarrow$ Compare calculated r to to absolute value of r' (particle)

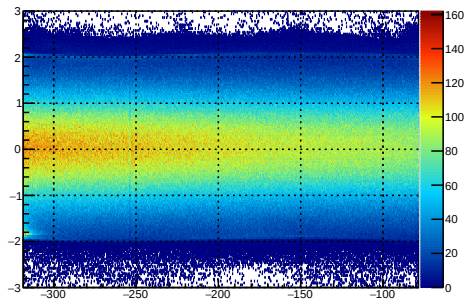
h_XY_full_target_length



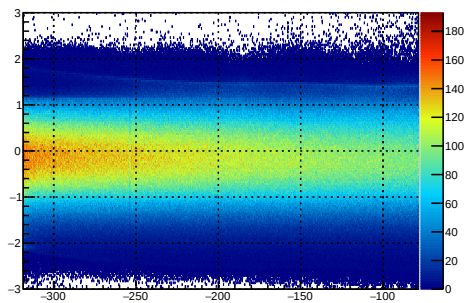
h_Z_full_length



h_ZX_full_target_length



h_ZY_full_target_length



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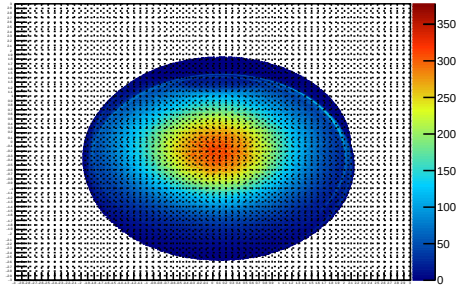
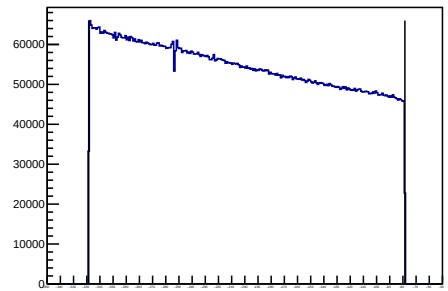


h_Z_full_length



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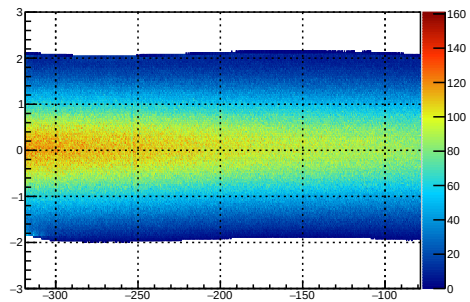

h_ZY_full_target_length