

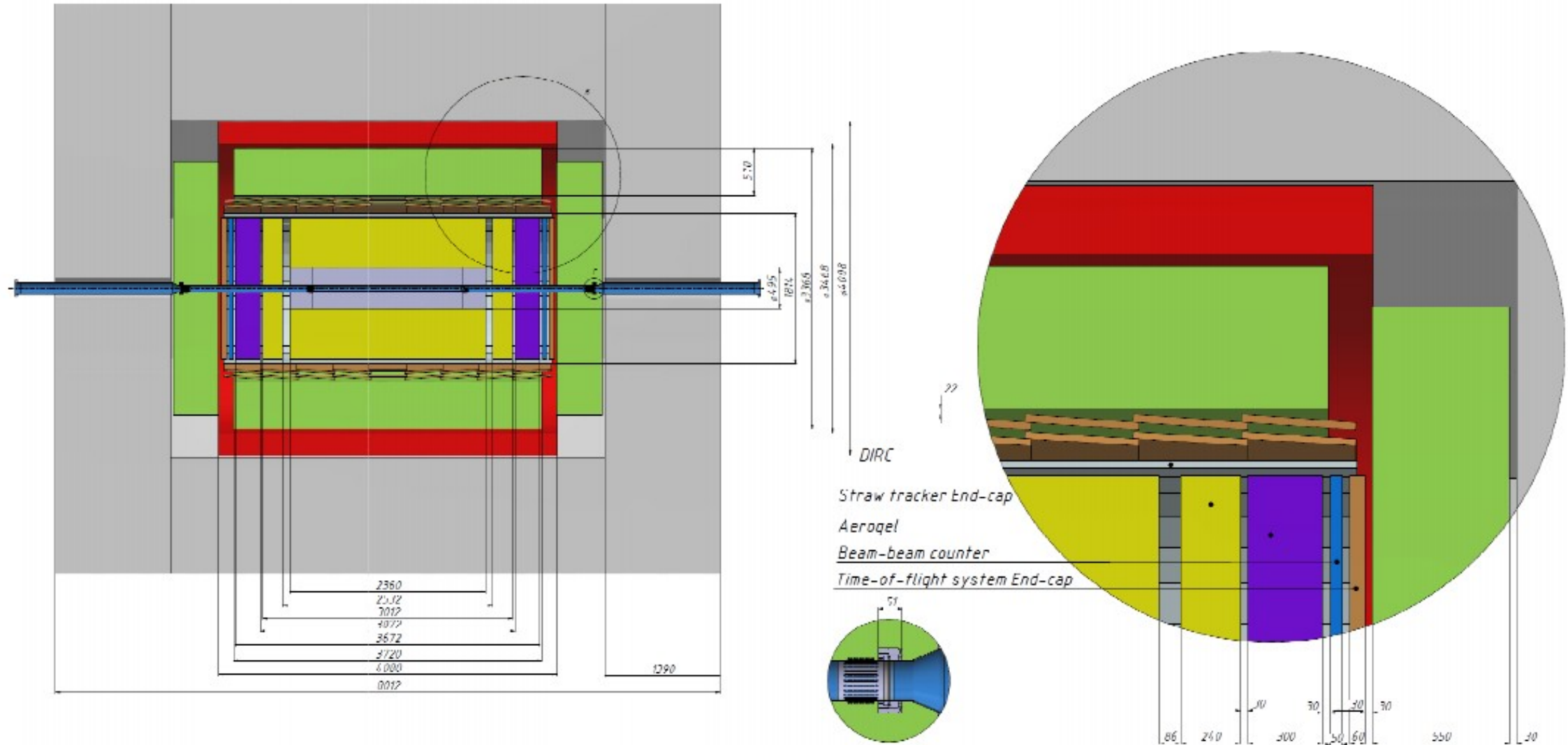
On the update of TOF PID parameters for new geometry

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SPD Physics Weekly

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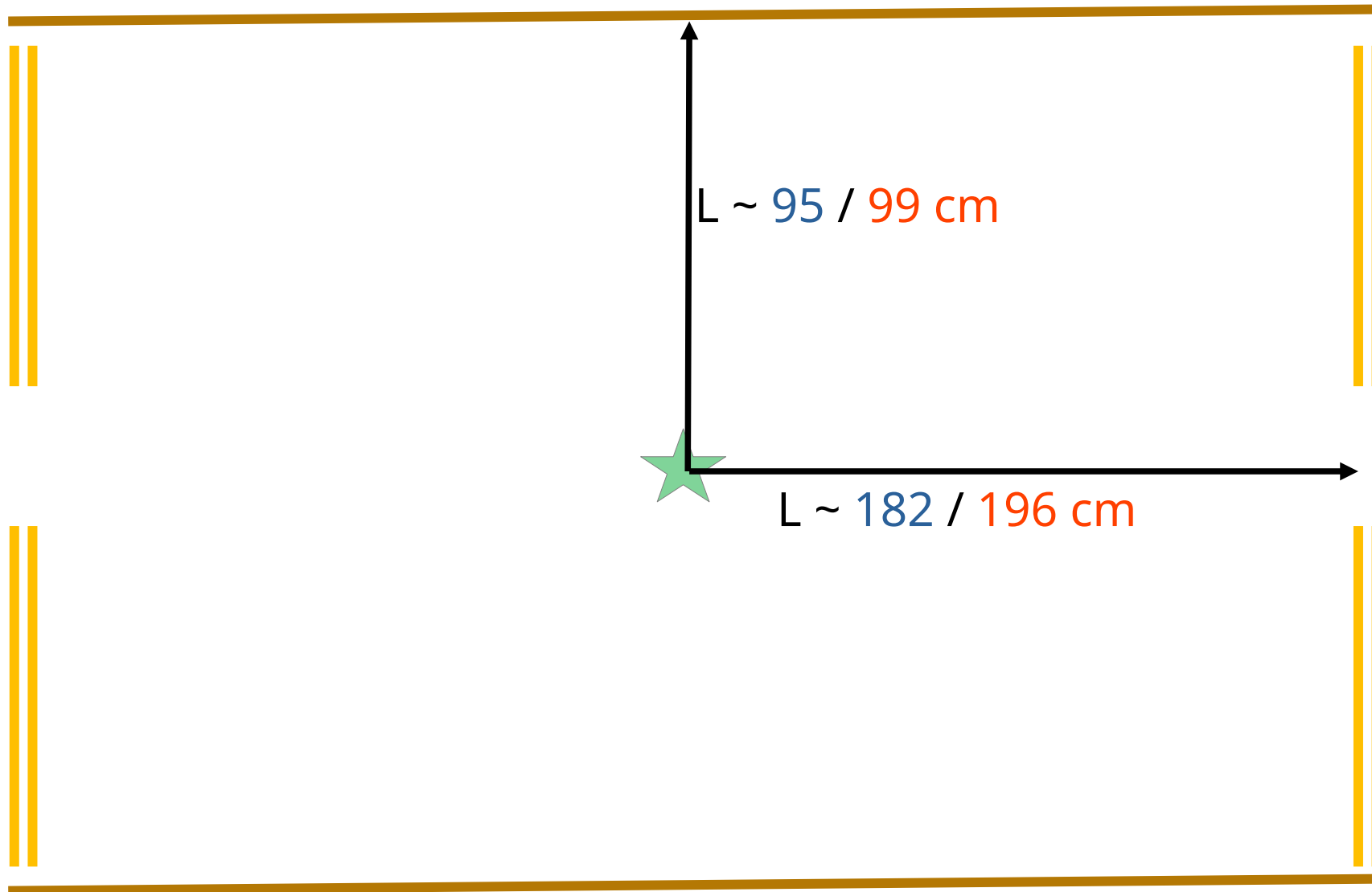
Geometry 2023



TOF geometry

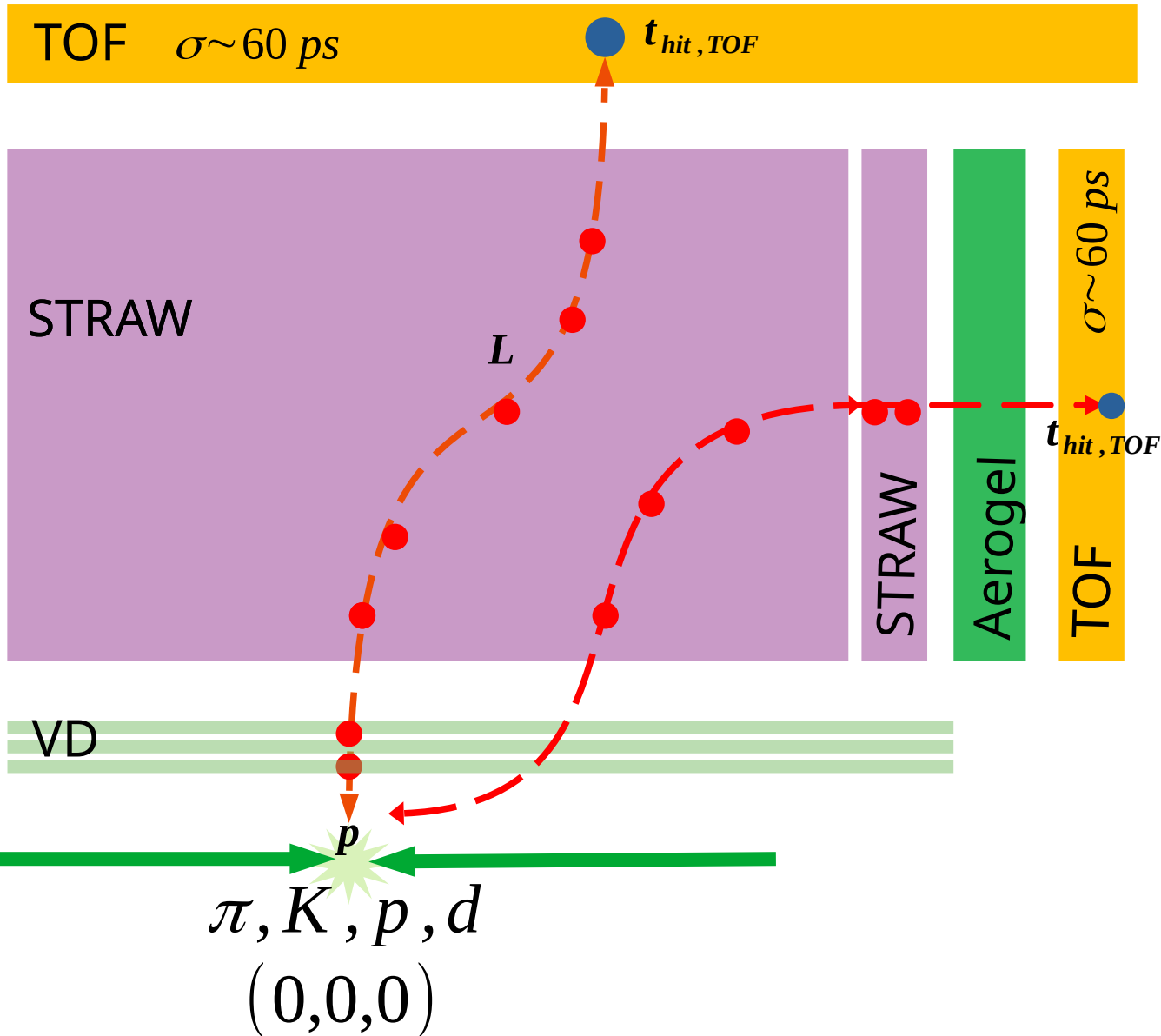
previous geometry

geometry 2023



TOF

Magnetic field

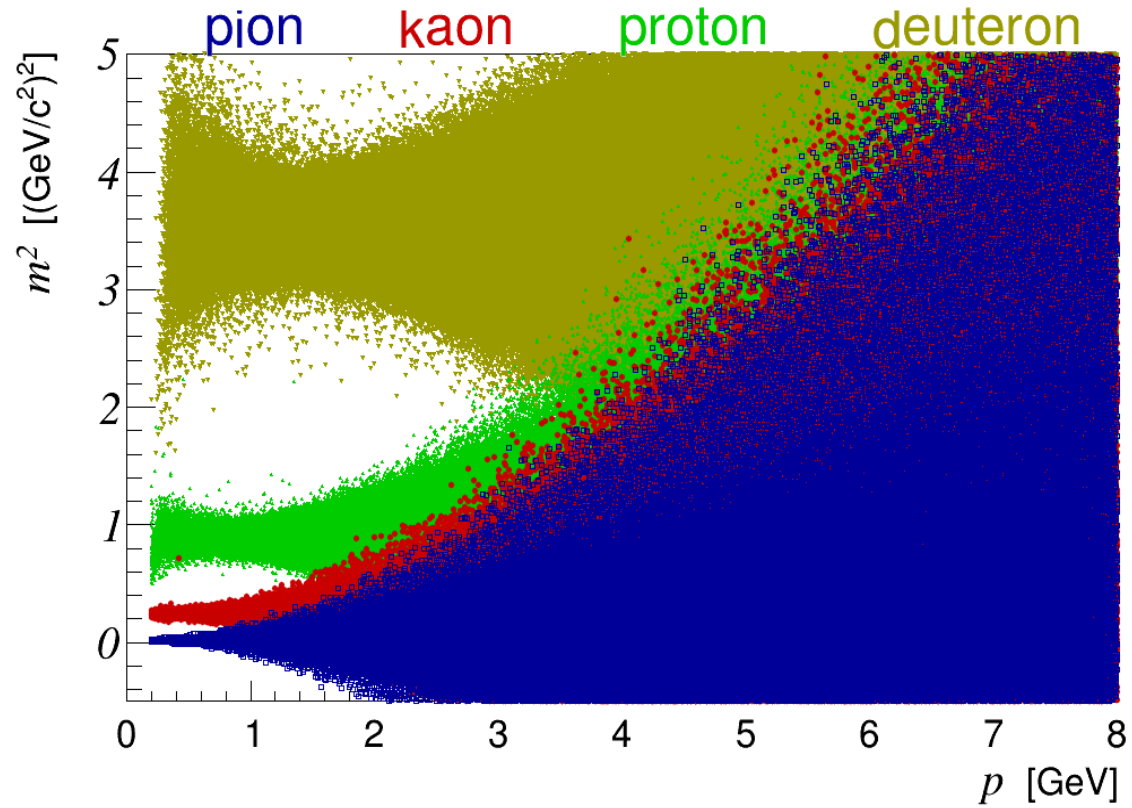



$$m^2 = \frac{p^2}{c^2} \left[\frac{t_{TOF}^2 c^2}{L^2} - 1 \right]$$

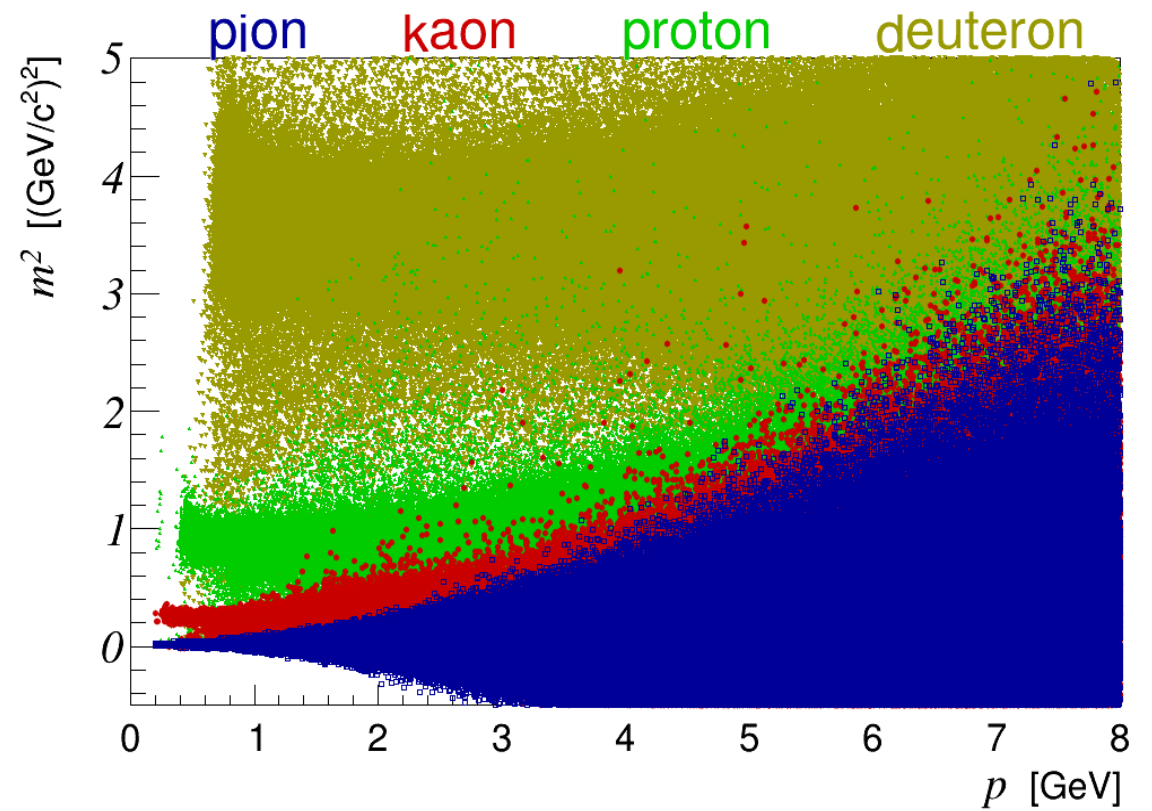
$$p \in [0.1; 8.0, \text{step} = 0.01 \text{ GeV}]$$

m^2 vs p : geometry 2023

Barrel



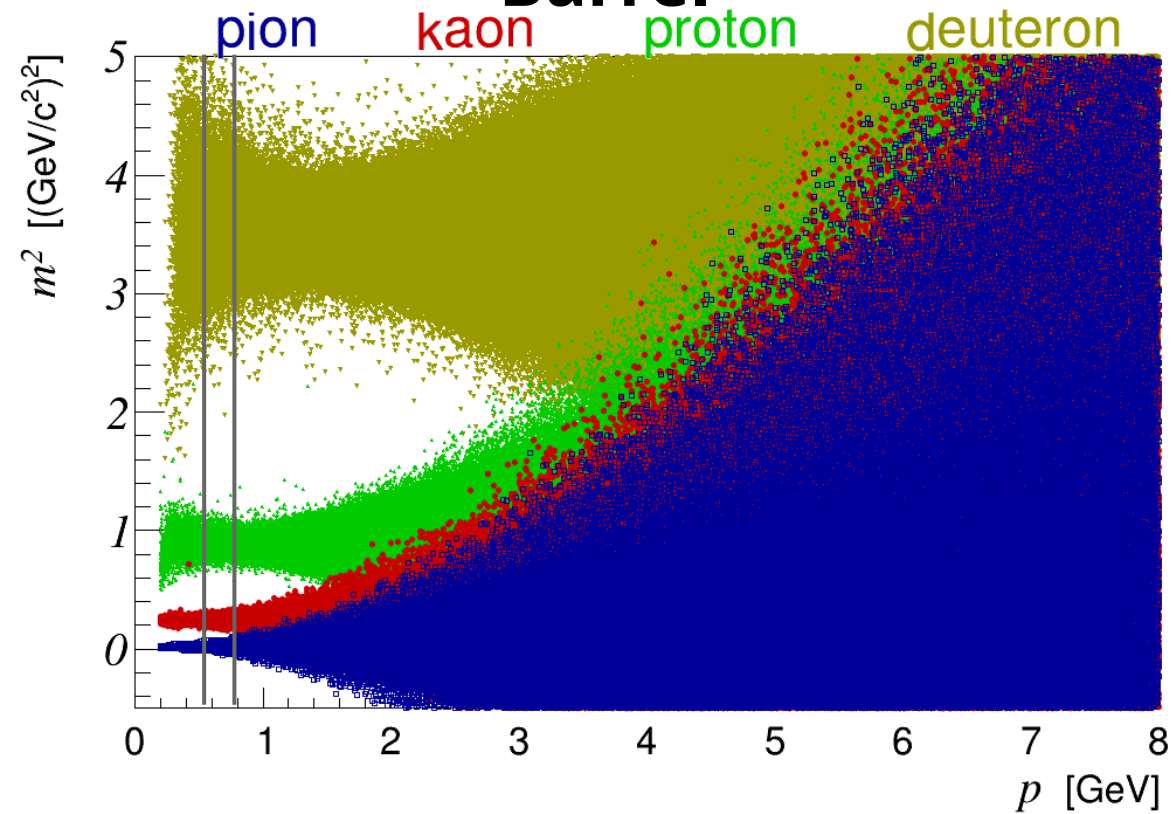
End-Cap



Parametrization

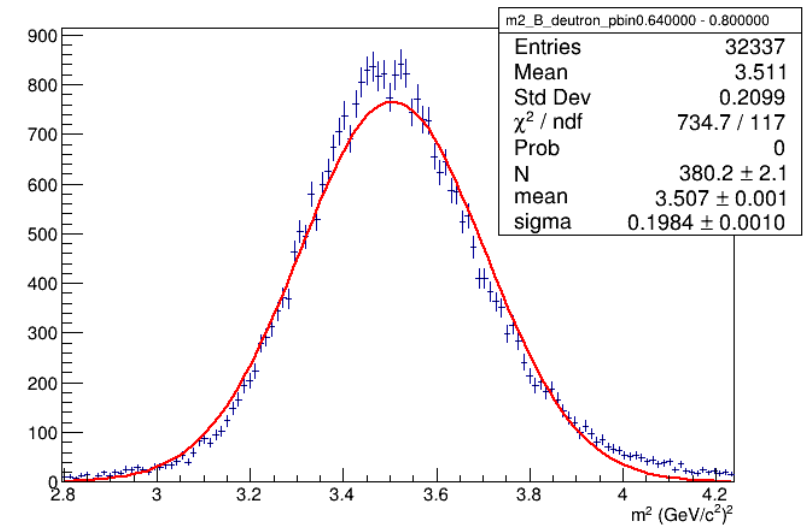
Fit m^2 distribution in 50 bins of momentum

Barrel

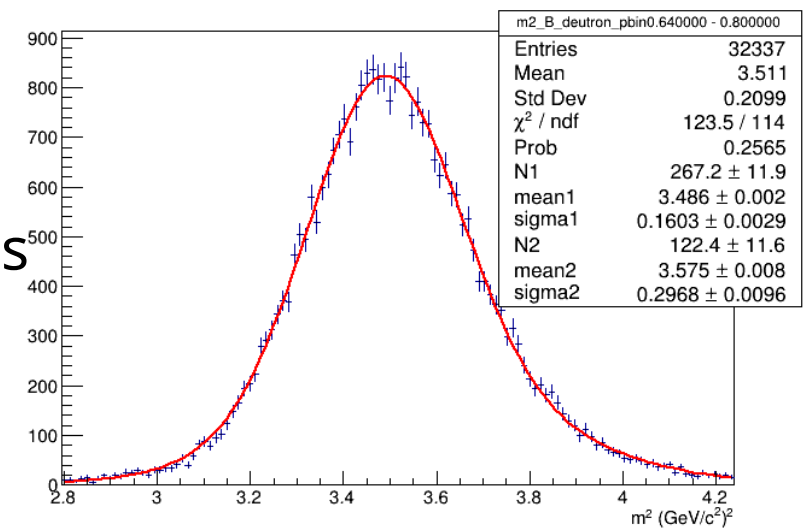


$P_{\text{bin}} = 0.64 - 0.8$ GeV
deuteron

oneGauss



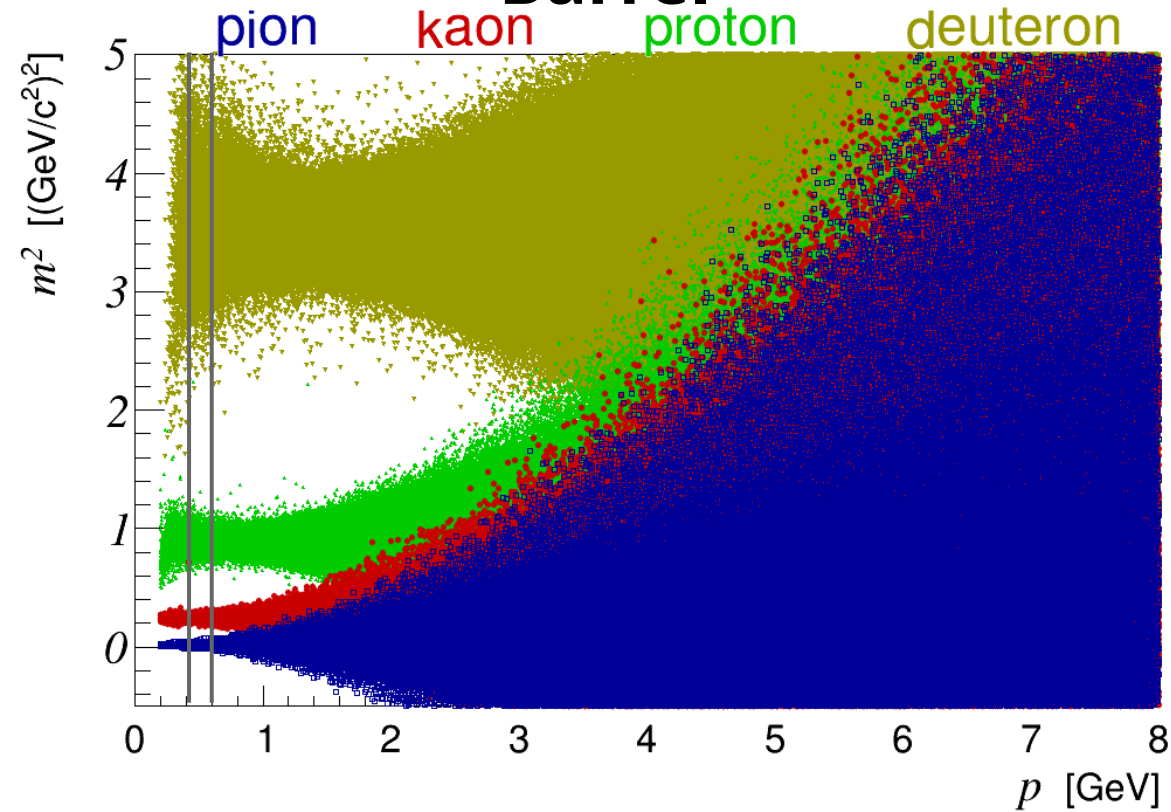
doubleGauss



Parametrization

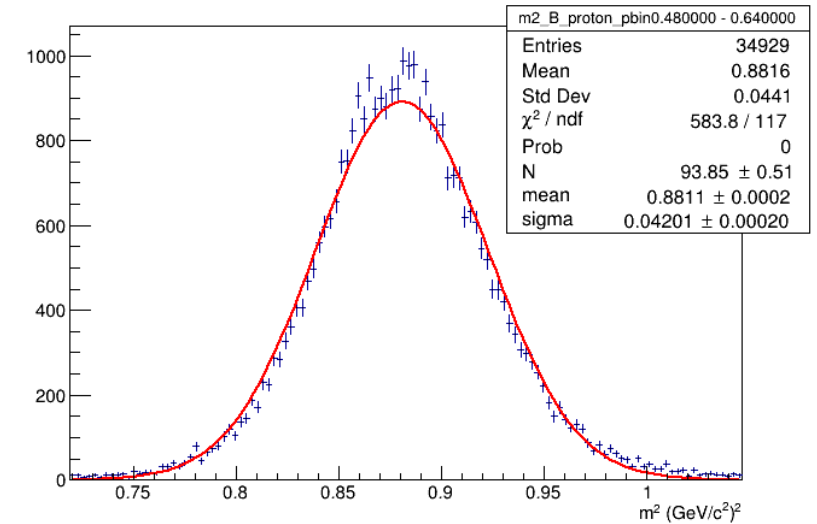
Fit m^2 distribution in 50 bins of momentum

Barrel

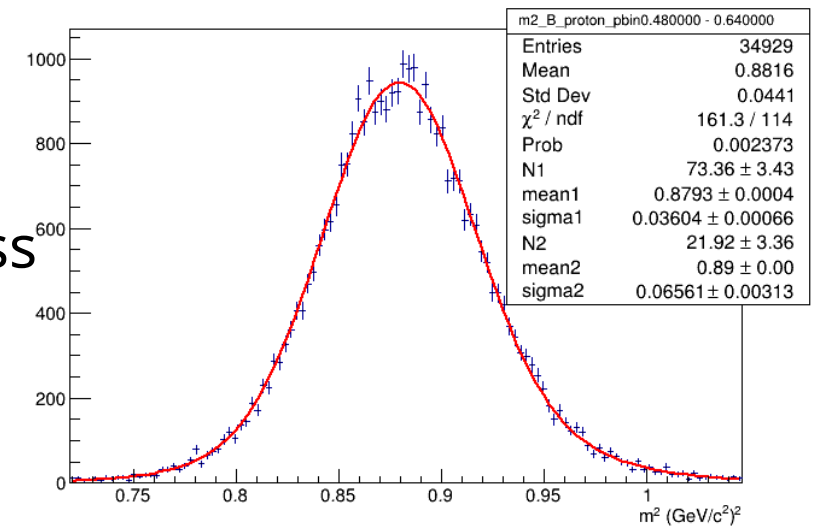


$P_{\text{bin}} = 0.48 - 0.64 \text{ GeV}$
proton

oneGauss

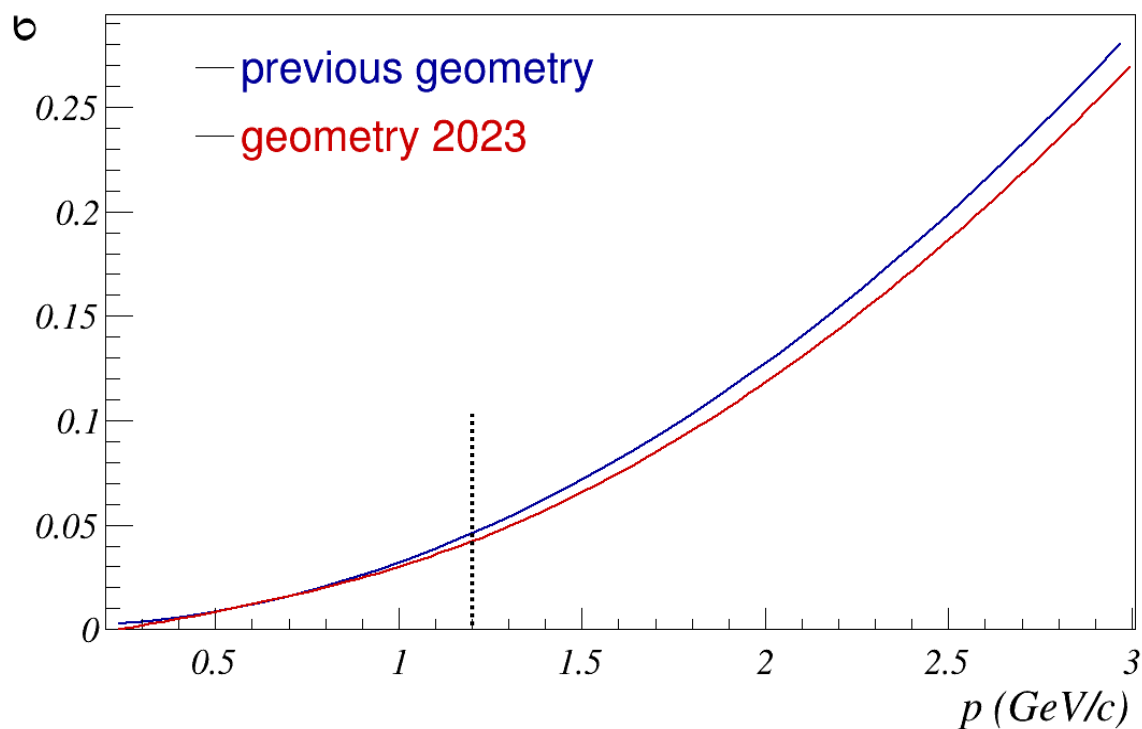


doubleGauss

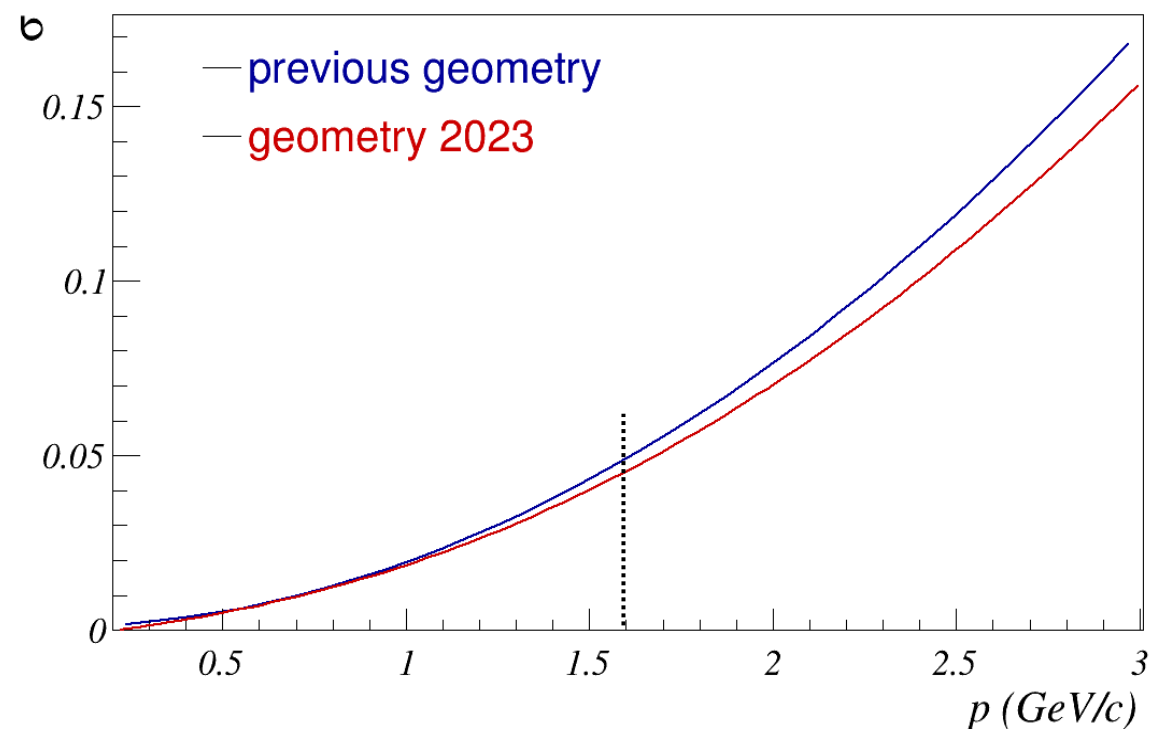


Comparison sigma: pion

Barrel



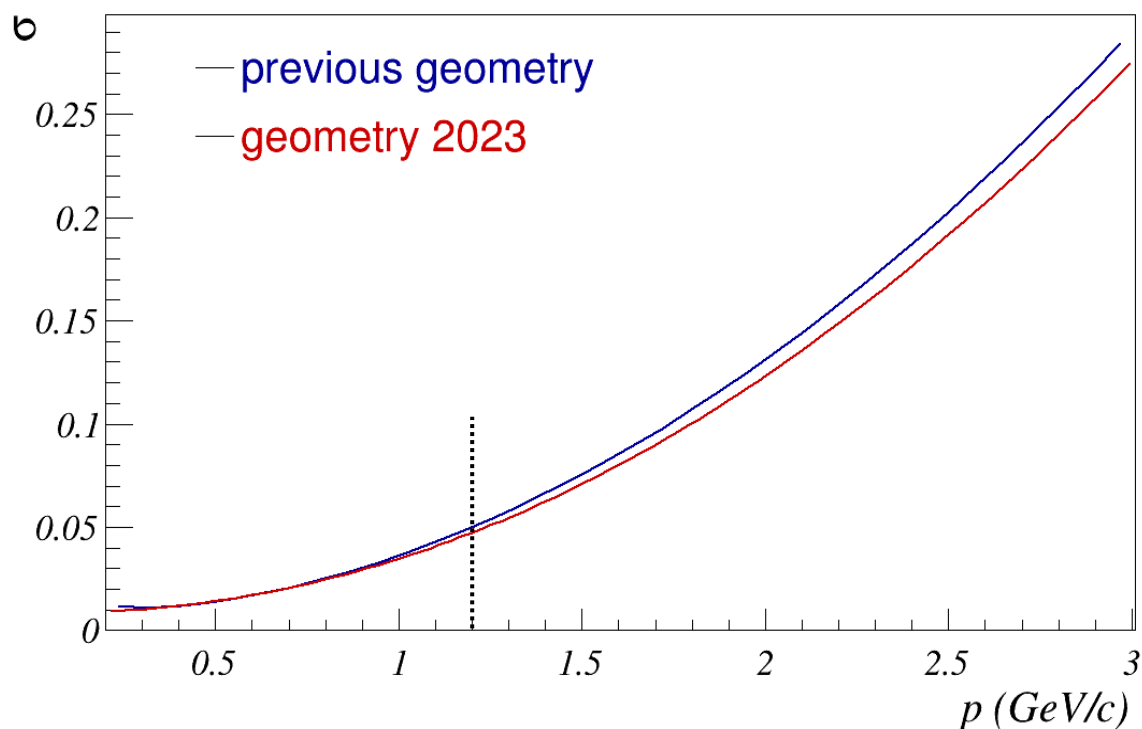
End-Cap



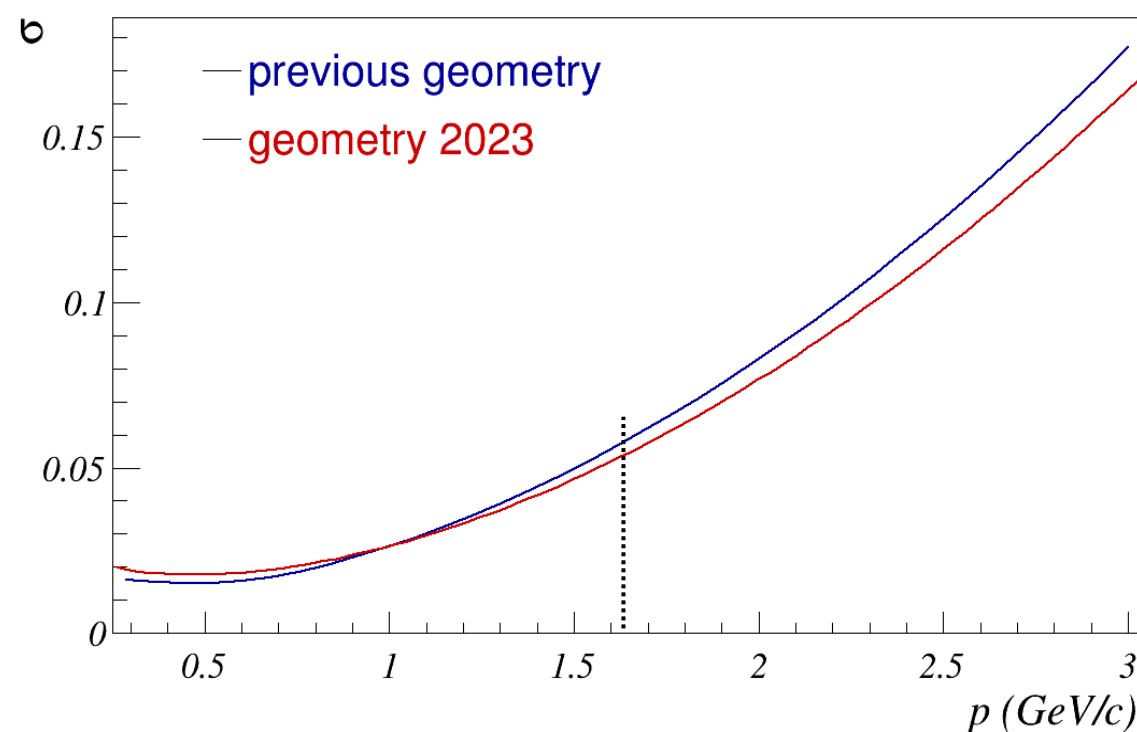
Line represents pion/kaon separation for 3 sigma

Comparison sigma: kaon

Barrel



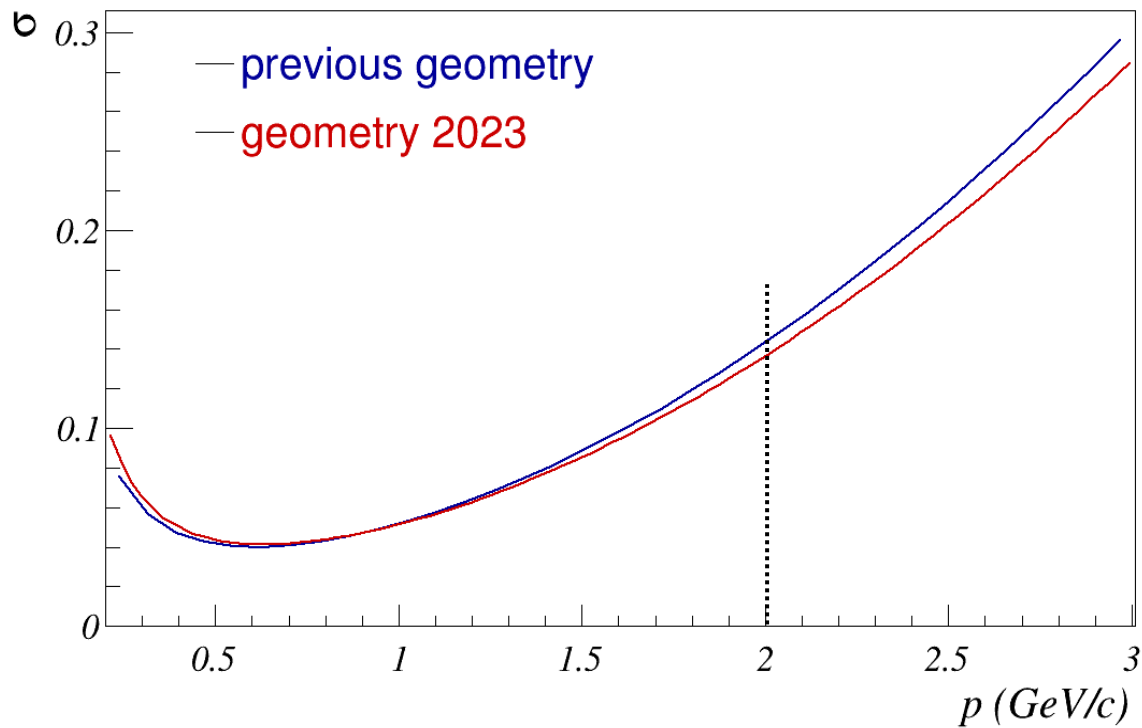
End-Cap



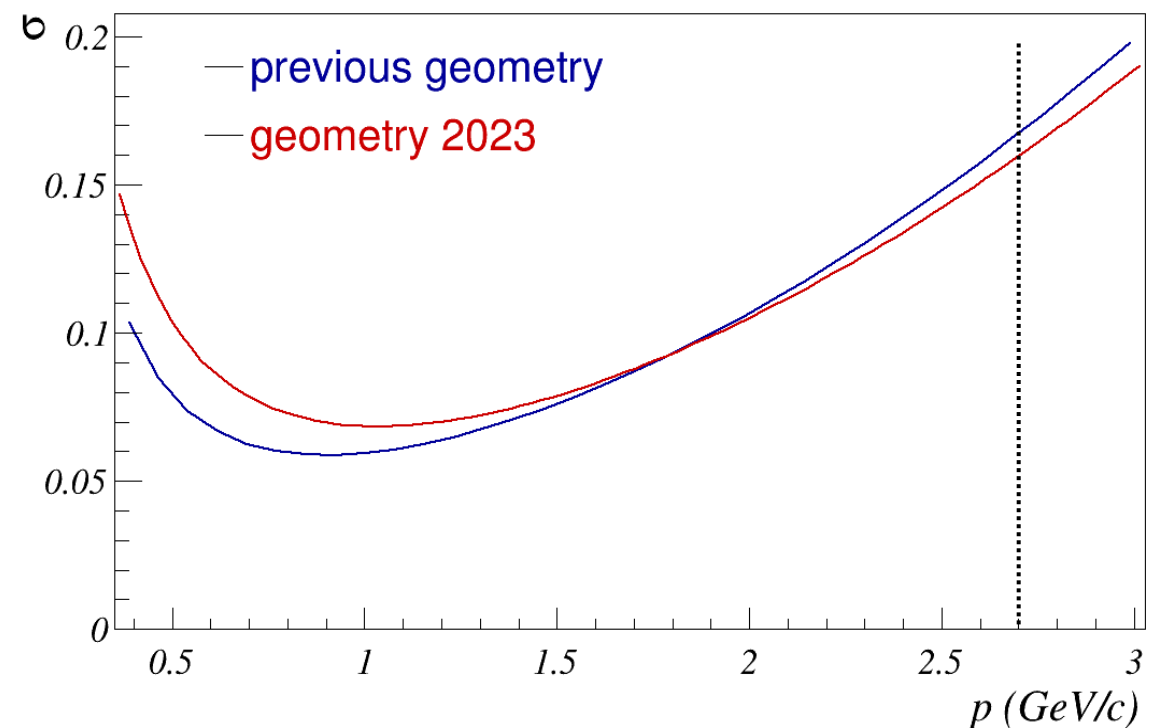
Line represents pion/kaon separation for 3 sigma

Comparison sigma: proton

Barrel



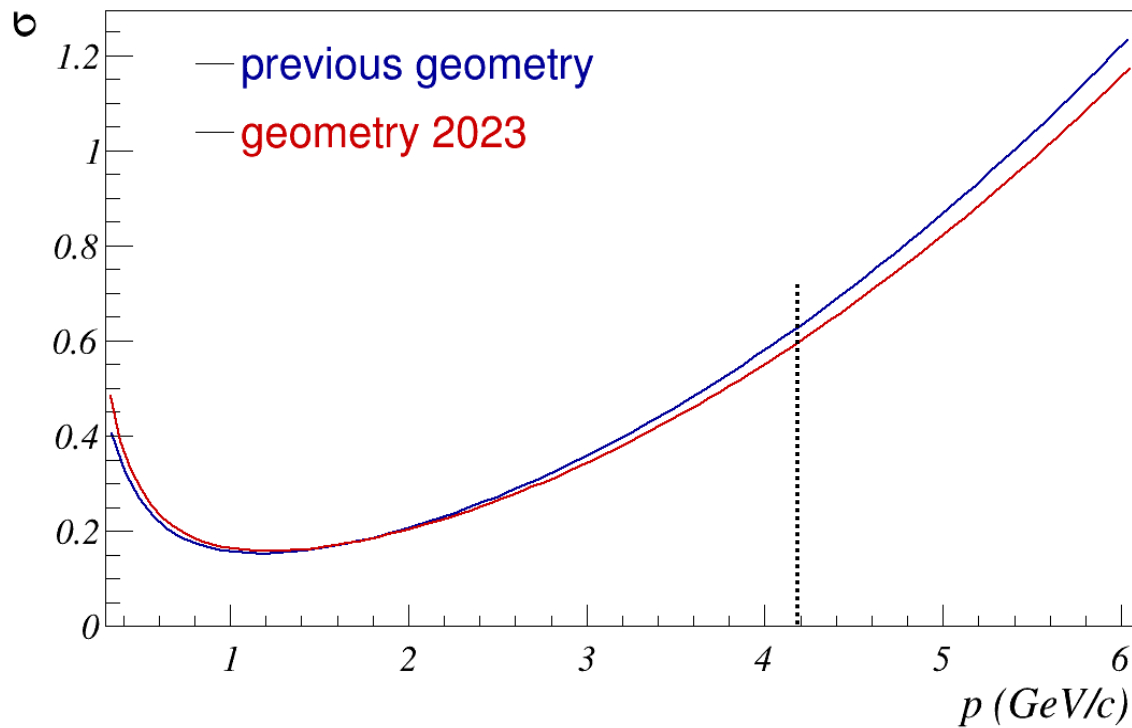
End-Cap



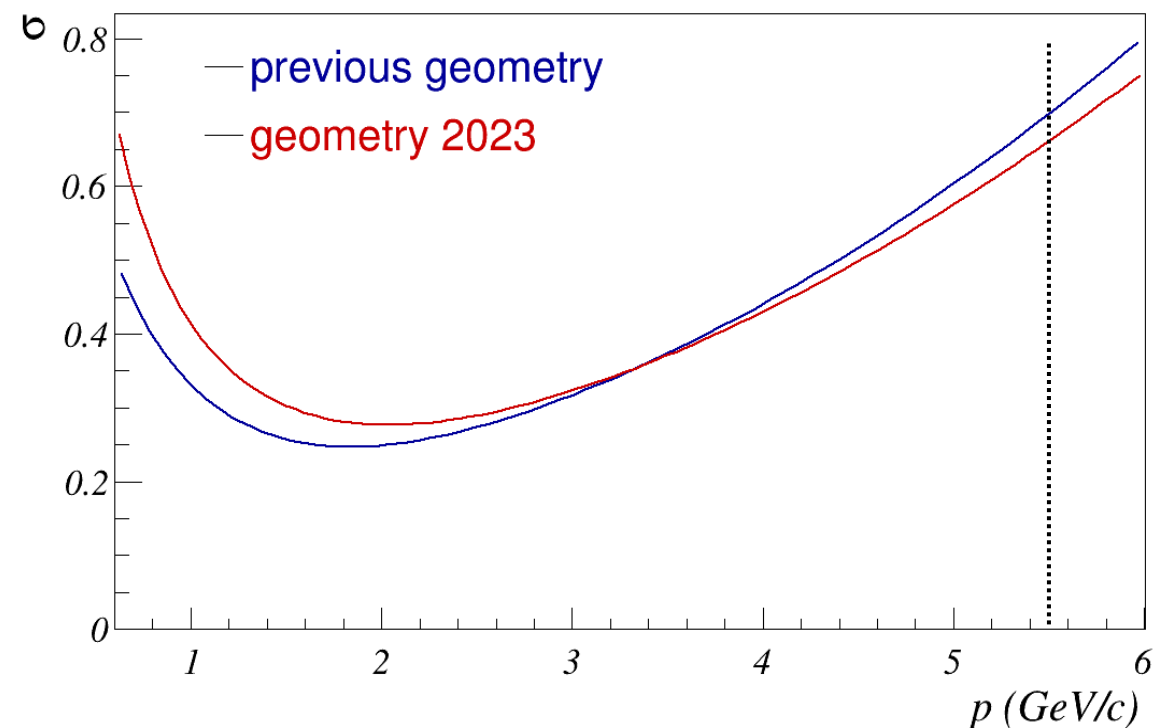
Line represents kaon/proton separation for 3 sigma

Comparison sigma: deuteron

Barrel



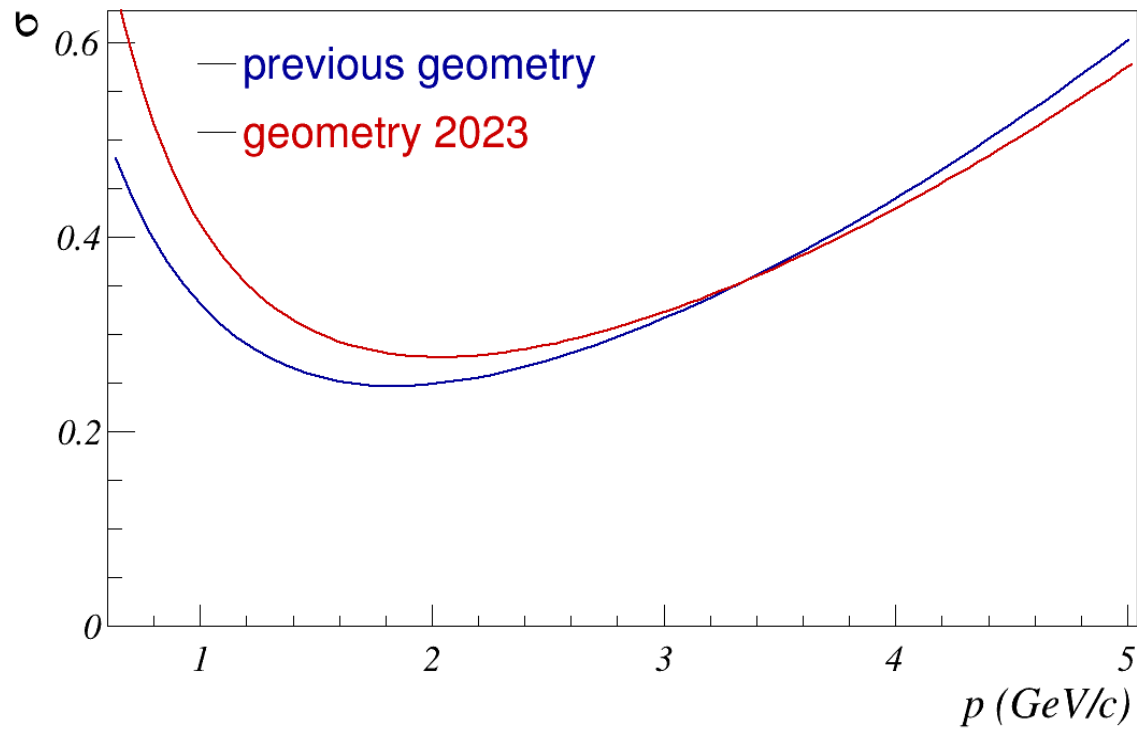
End-Cap



Line represents proton/deuteron separation for 3 sigma

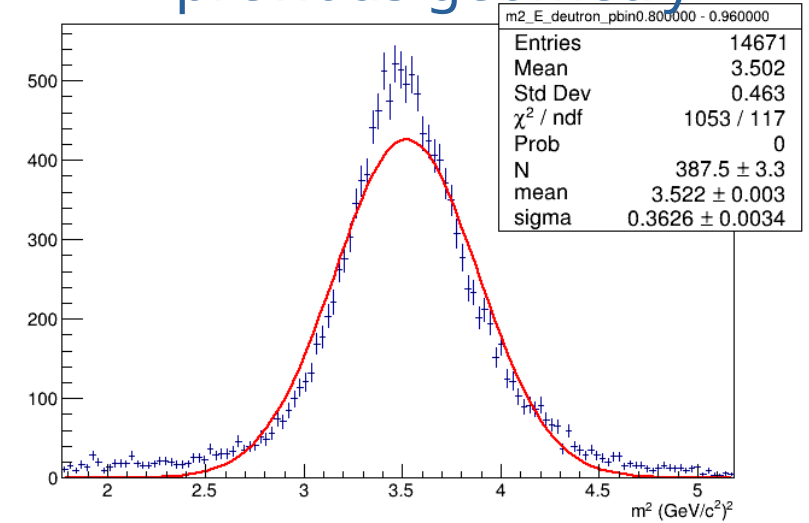
Deuteron

End-Cap

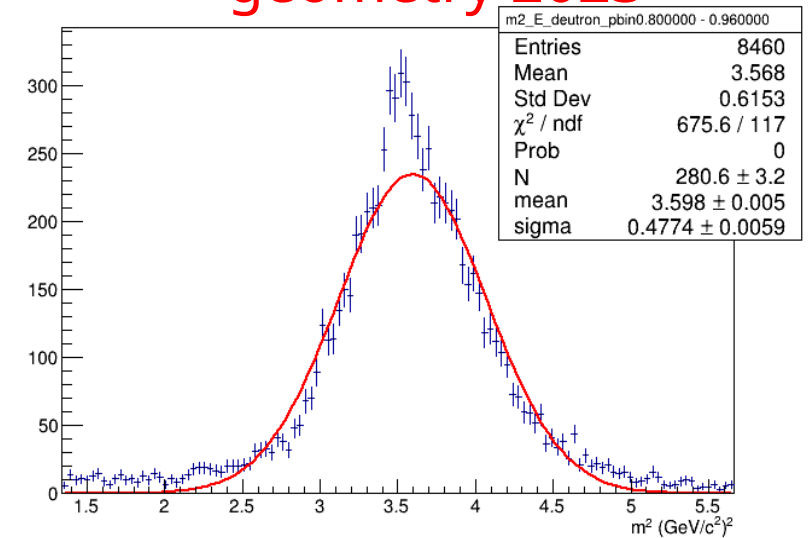


$P_{\text{bin}} = 0.8 - 0.96$ GeV

previous geometry



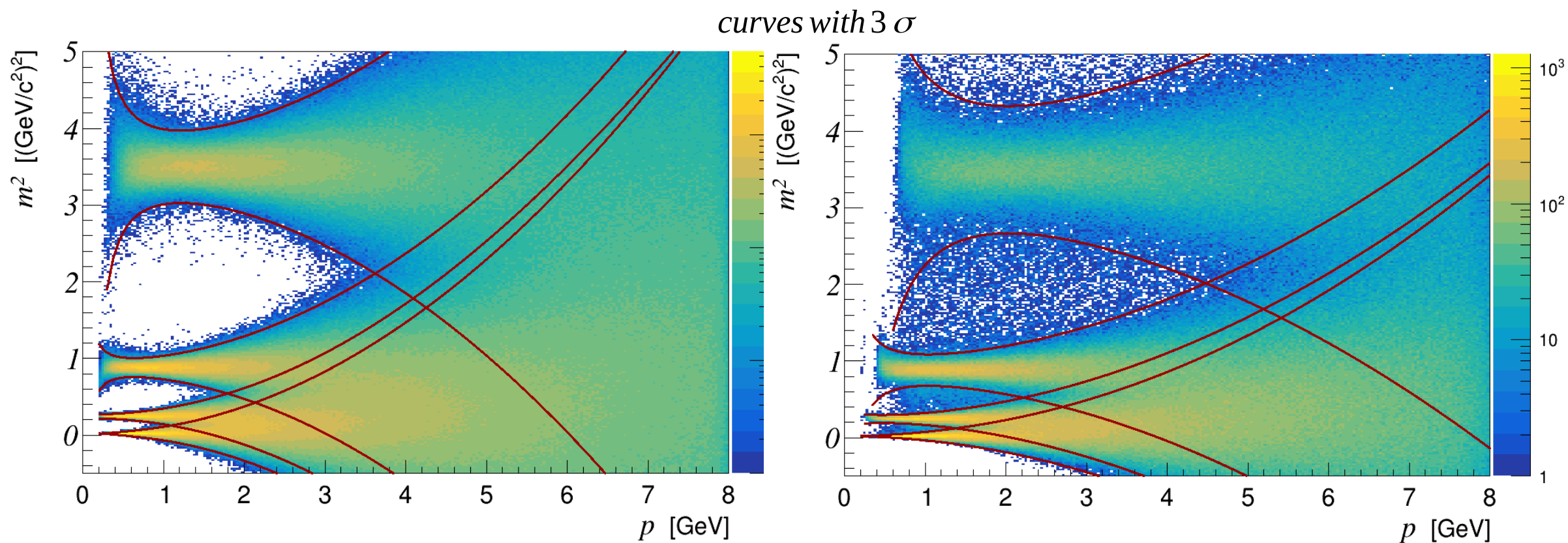
geometry 2023



m^2 vs p : geometry 2023

Barrel

End-Cap



Conclusion

- Parametrization for geometry 2023 is updated.