Update on hyperon (Lambda0 - AntiLambda0) simulations with the PANDA GEM-Tracker

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Motivation

- **To investigate the invariant mass reconstruction for the anti-p + p ⟶ Λ0 + anti-Λ0 as a important hyperonic channel using PANDA GEM-Tracker.**
- **This channel has been chosen since Lambda is the lightest hyperon, which is easiest to produce and all final state particles are charged and most of them are flighted in the forward directions.**

Benchmark channel including : anti-p + p → Λ0 + anti-Λ0

- Λ0 → p+ & π–
- Anti-Λ0 → p- & π+

The exact mass value of the Λ0 and anti-Λ0
1115.683±0.006MeV/c²

In continuous of my two previous presentations (PCM LVIII (results for the Realistic P.R. and Isotropic D.) & PCM 17/1 (results for the Realistic P.R. and Boosted D.)):

To show the recent results

- Using Idealistic Pattern Recognition

- In the case of the Forward Peaking (Boosted Distribution)

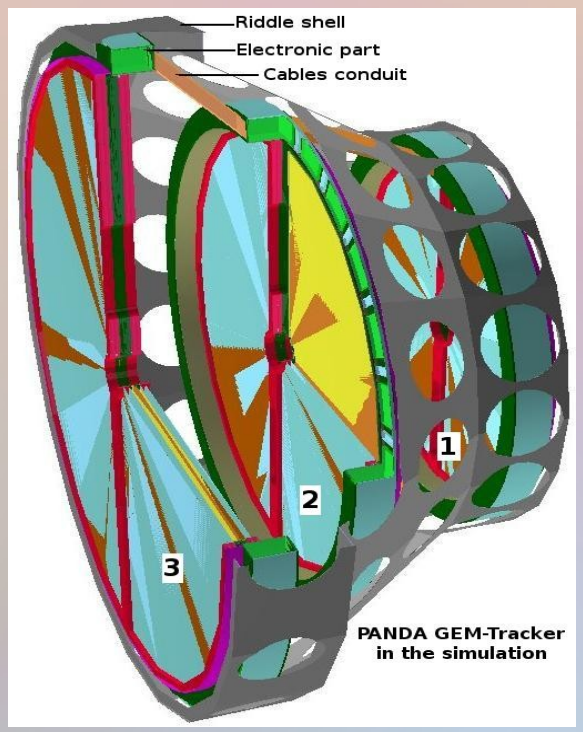
Reminder: Investigation of Lambda – Anti Lambda Invariant Mass Reconstruction with PANDA GEM-Tracking Detector (Realistic Pattern Recognition)

The simulation conditions:

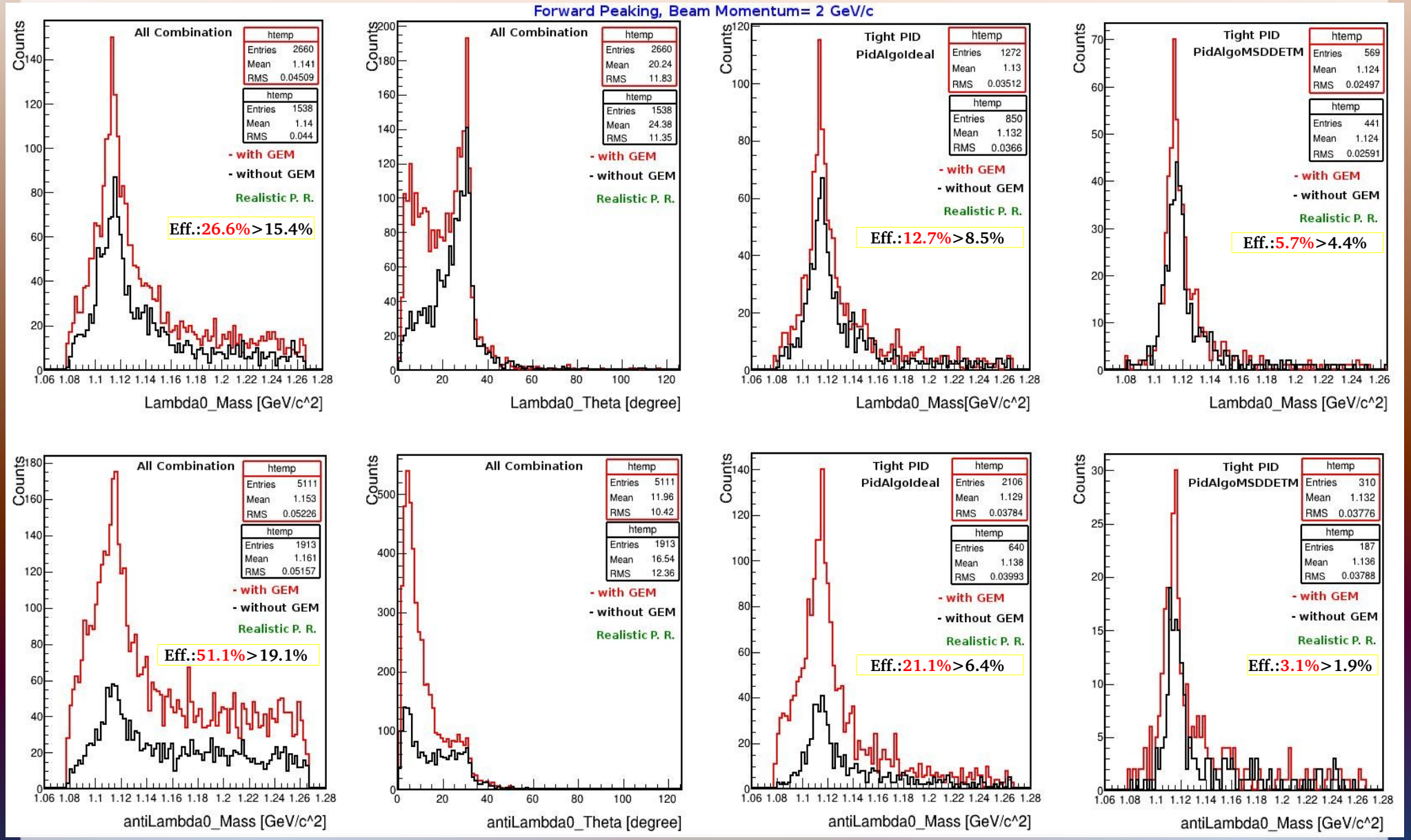
- No. of Events=10000
- SimEngine =TGeant4
- Event generator=EvtGenDirect
- Beam Momentum= 2 [GeV/c]
- lambda0_antilambda0_piminus_p_piplus_antip.dec (LambdaLambdaBar - sitting beam momentum)
- Boosted distribution (forward peaking)
- PANDA setup without and with full geometry of the GEM
- Using PndBarrelTrackFinder (realistic pattern recognition)
- For Tight PID: using "PidAlgoMVD, STT, DRC, DISC, EMC, MDT, TOF" and "PidAlgoIdeal"
- Using Revision 29629 of PandaRoot

Updated Geomatry :
gem_3Stations_realistic_v2.root
gem_3Stations_realistic_v2.digi.par

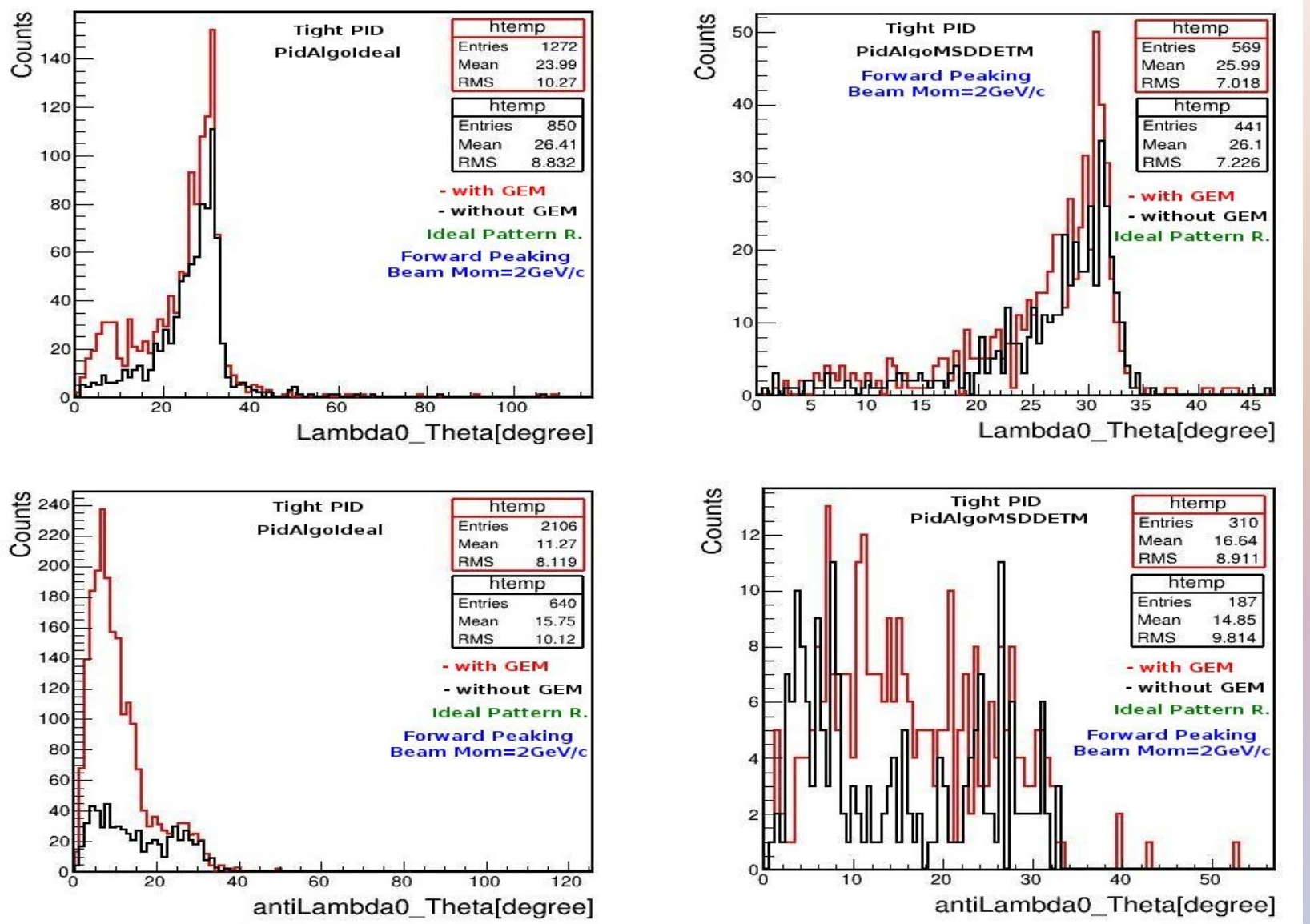
Covering Polar Angles:
about 2-22 degrees in forward directions



Beam Momentum=2GeV/c, Boosted distribution (Forward Peaking), Mass Reconstruction, Using PndBarrelTrackFinder (Realistic Pattern Recognition)



Beam Momentum=2GeV/c, Boosted distribution (Forward Peaking), Tight PID, Theta Distribution
Using PndBarrelTrackFinder (Realistic Pattern Recognition)



Beam Momentum = 2GeV/c , Boosted distribution (Forward Peaking), Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

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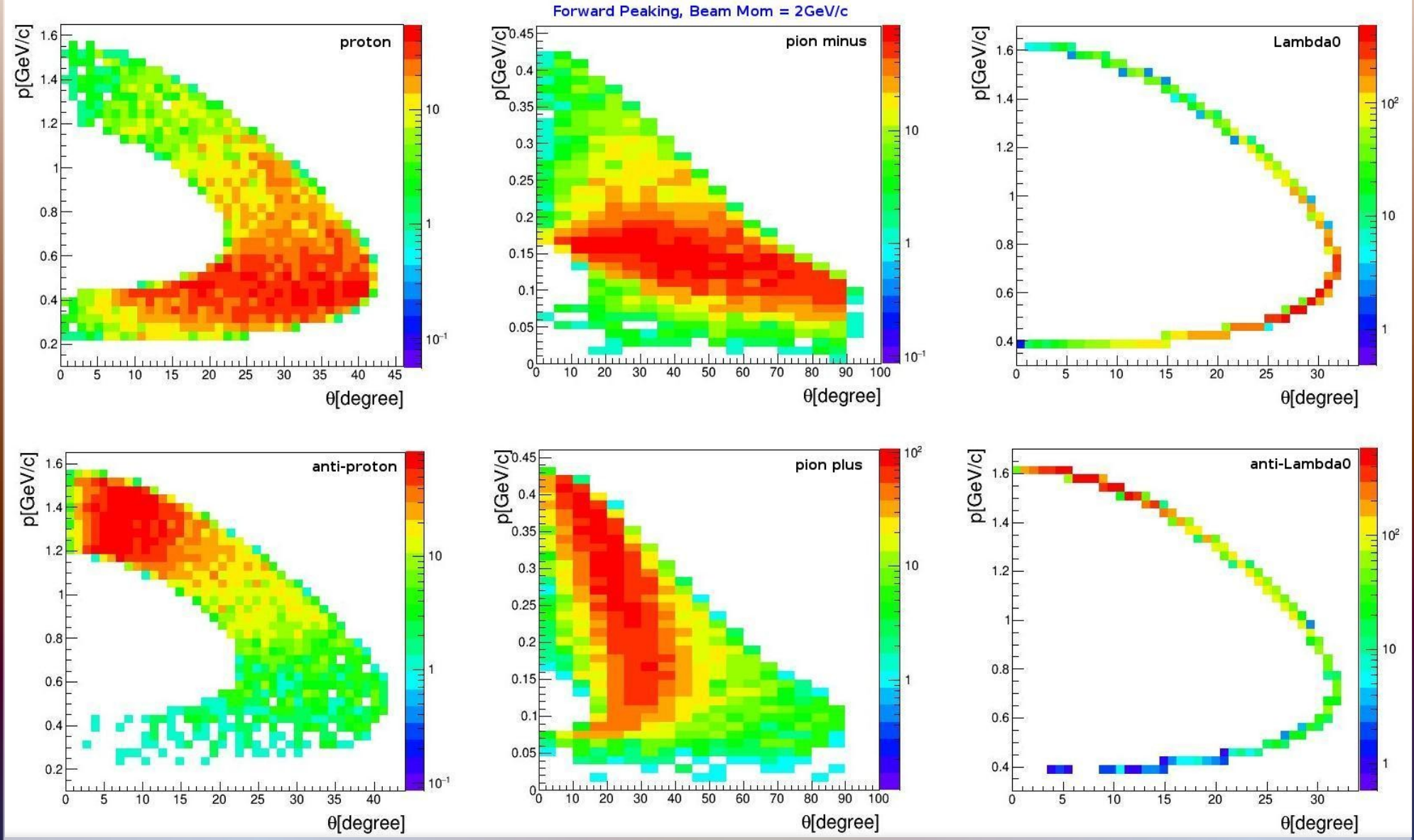
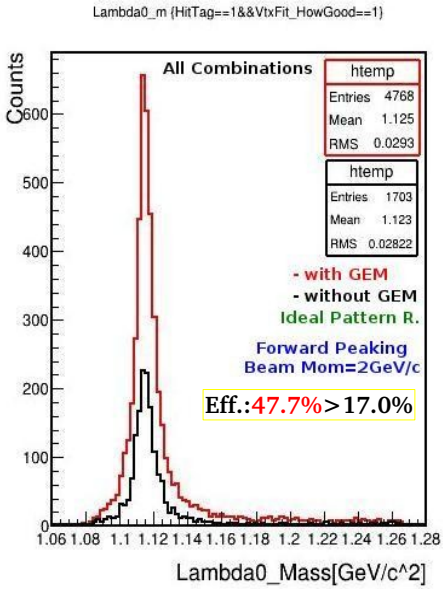
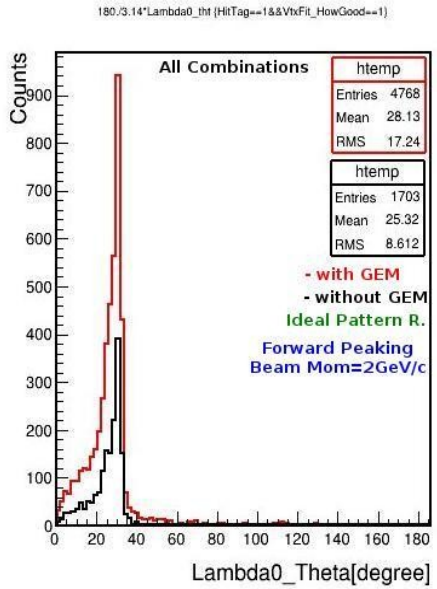
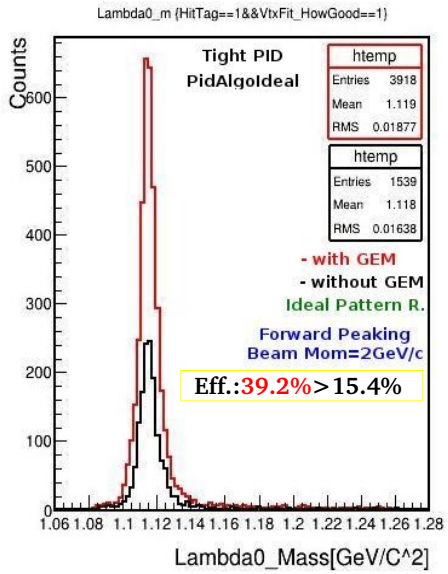
Beam Momentum=2GeV/c, Boosted distribution (Forward Peaking), momentum vs theta,
Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

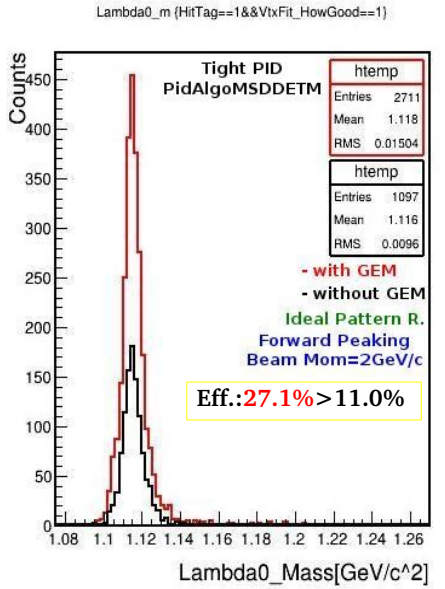


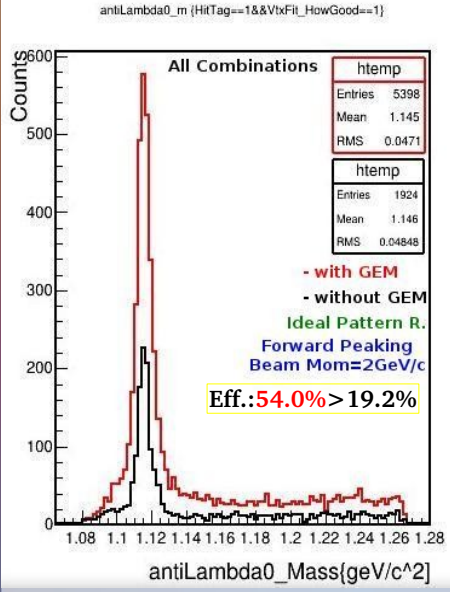
Beam Momentum=2GeV/c, Boosted distribution (Forward Peaking), Mass Reconstruction, Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

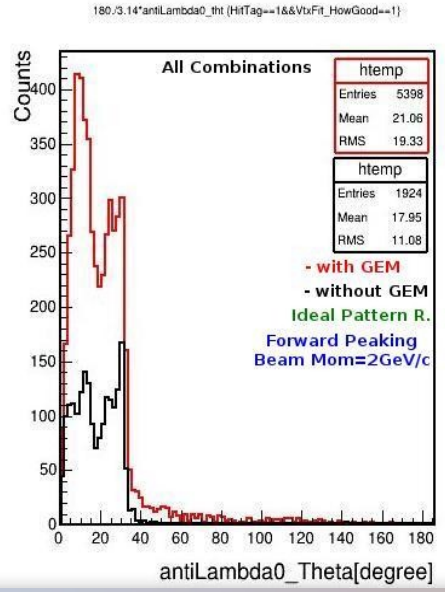


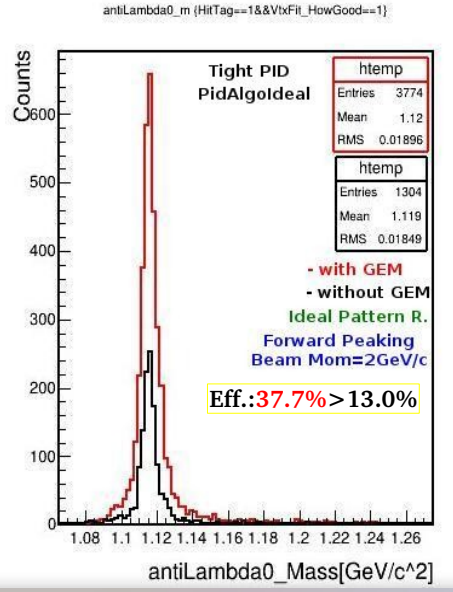


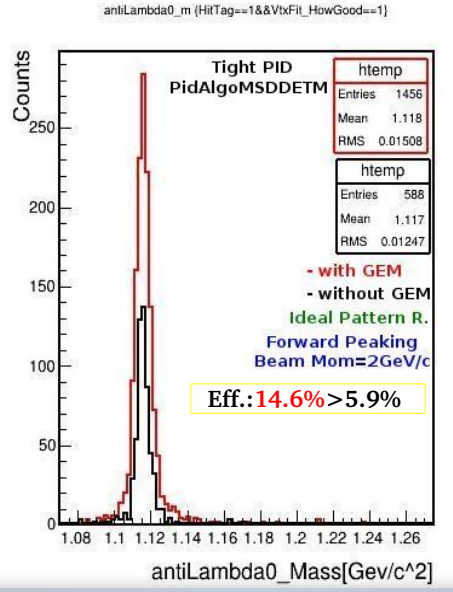




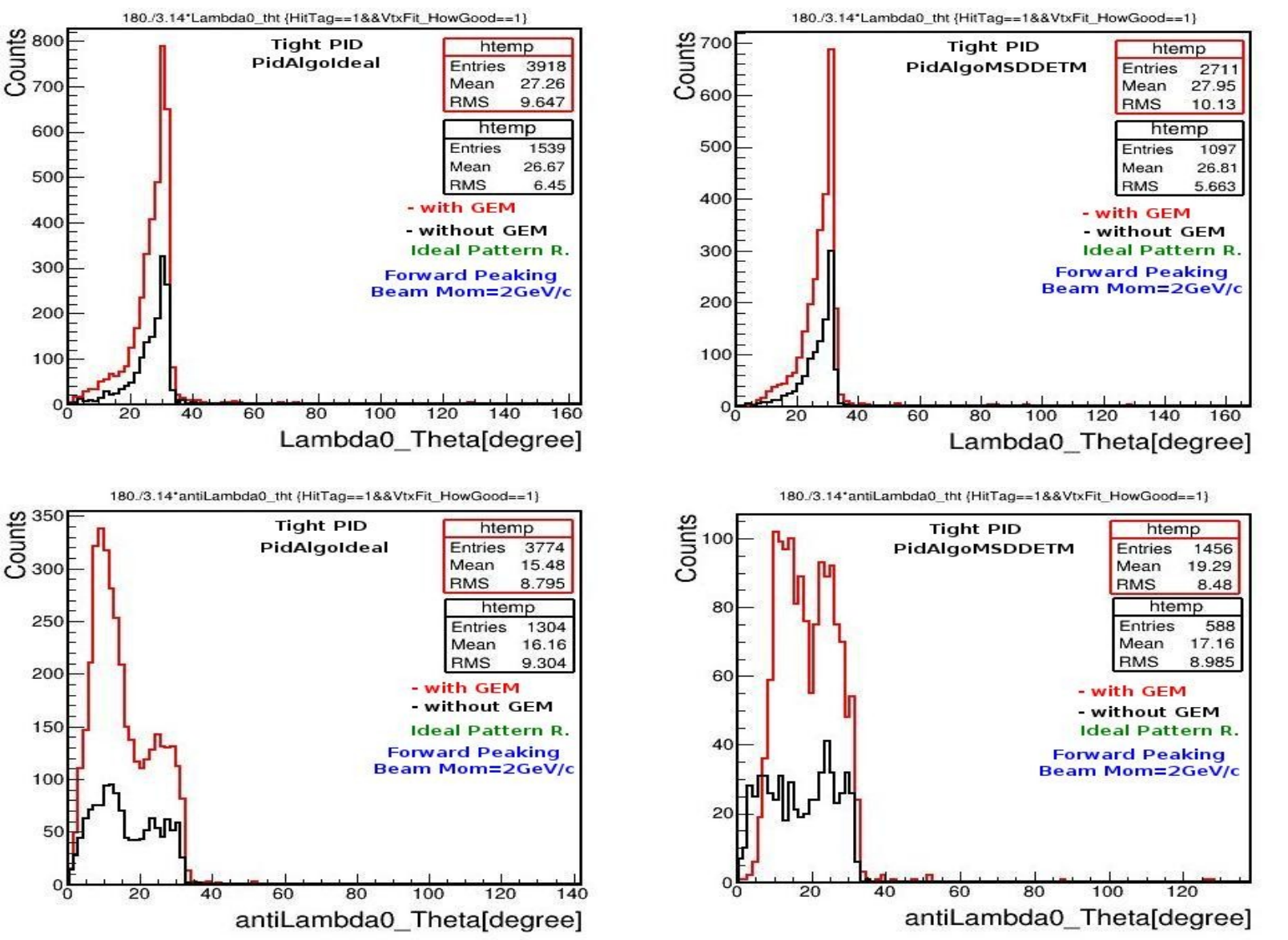








Beam Momentum=2GeV/c, Boosted distribution (Forward Peaking), Tight PID, Theta Distribution, Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)



Summary

- Study about forward peaking using idealistic pattern recognition is done.
- Using GEM has a good improvement for Anti-Lambdas mass reconstruction.
- Lambdas come from low momentum tracks and they have a large angular distribution.

More Results

Beam Momentum=2GeV/c, Isotropic distribution, Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

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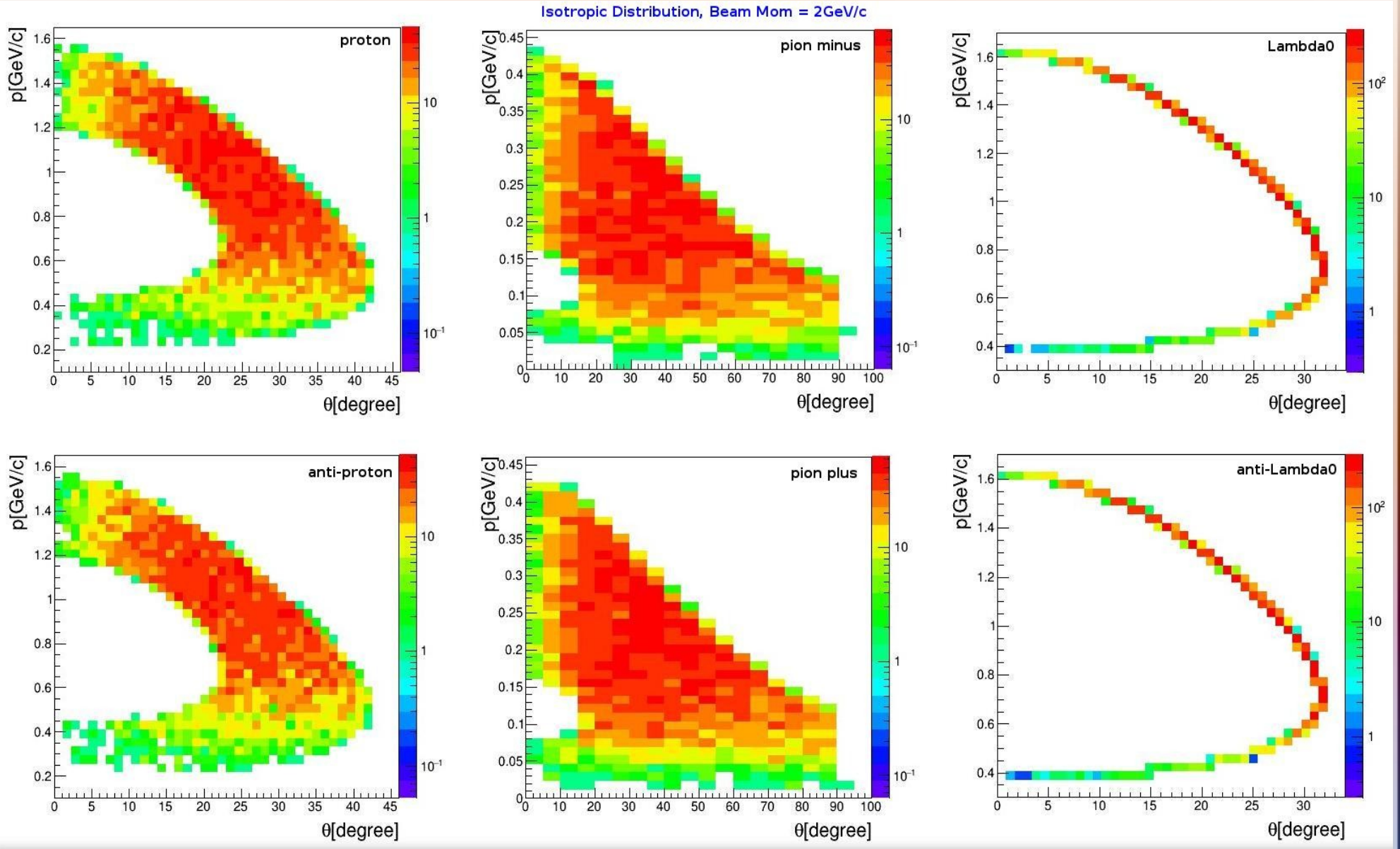
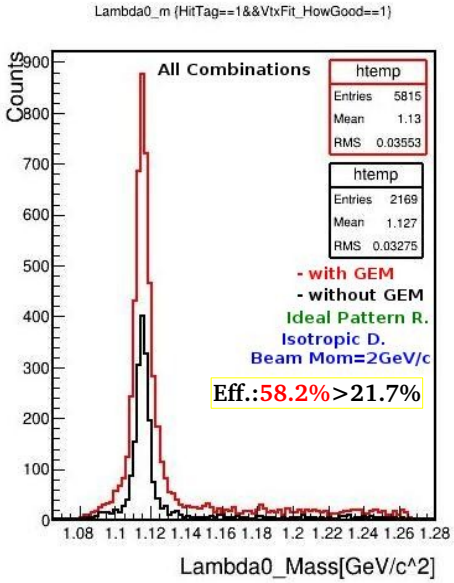
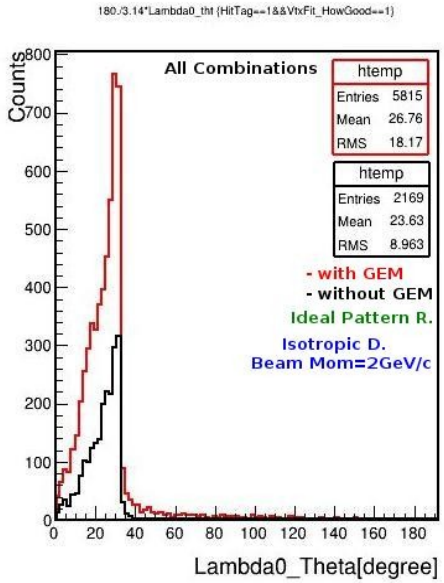
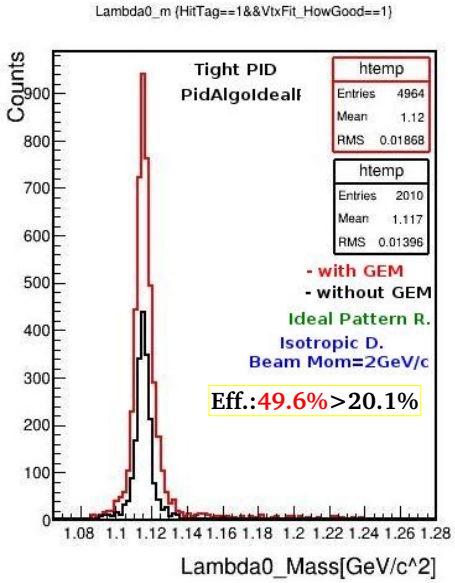
Beam Momentum=2GeV/c, Isotropic distribution, momentum vs theta, Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

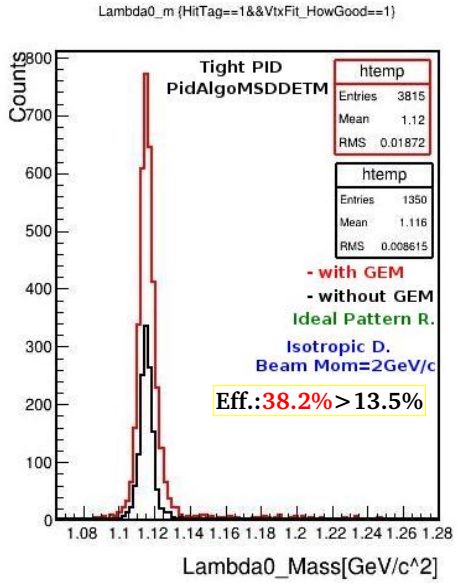


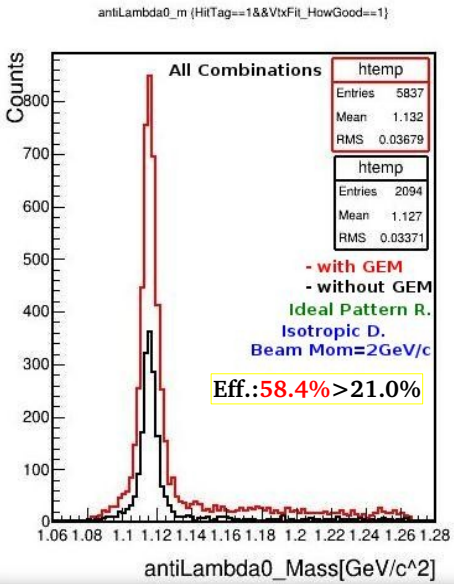
Beam Momentum=2GeV/c, Isotropic distribution, Mass Reconstruction, Using PndSttMvdGemTrackingIdeal (Idealistic Pattern Recognition)

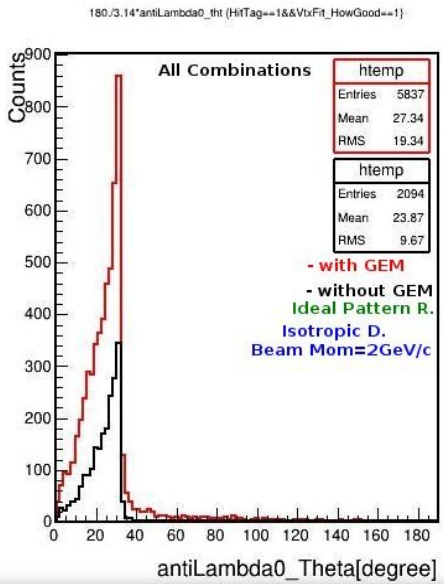


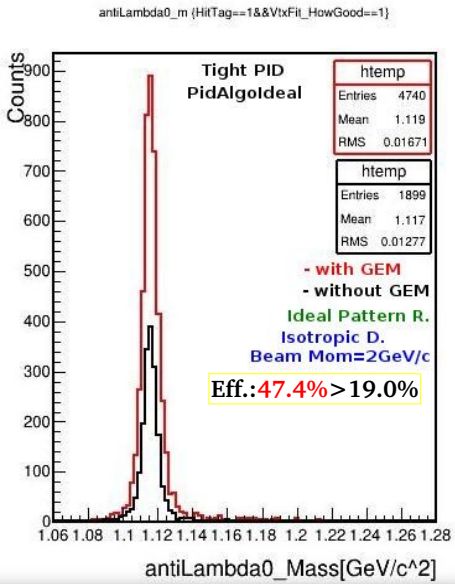


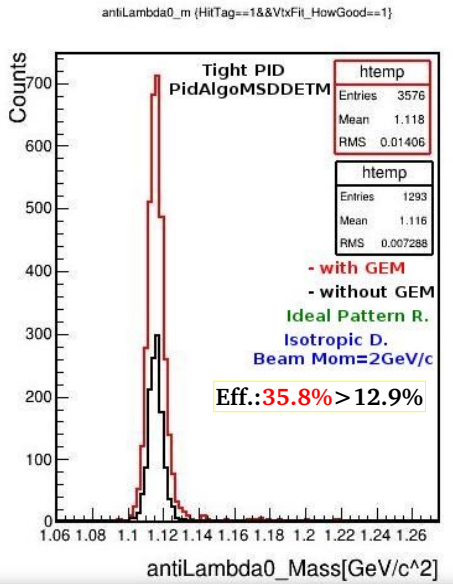
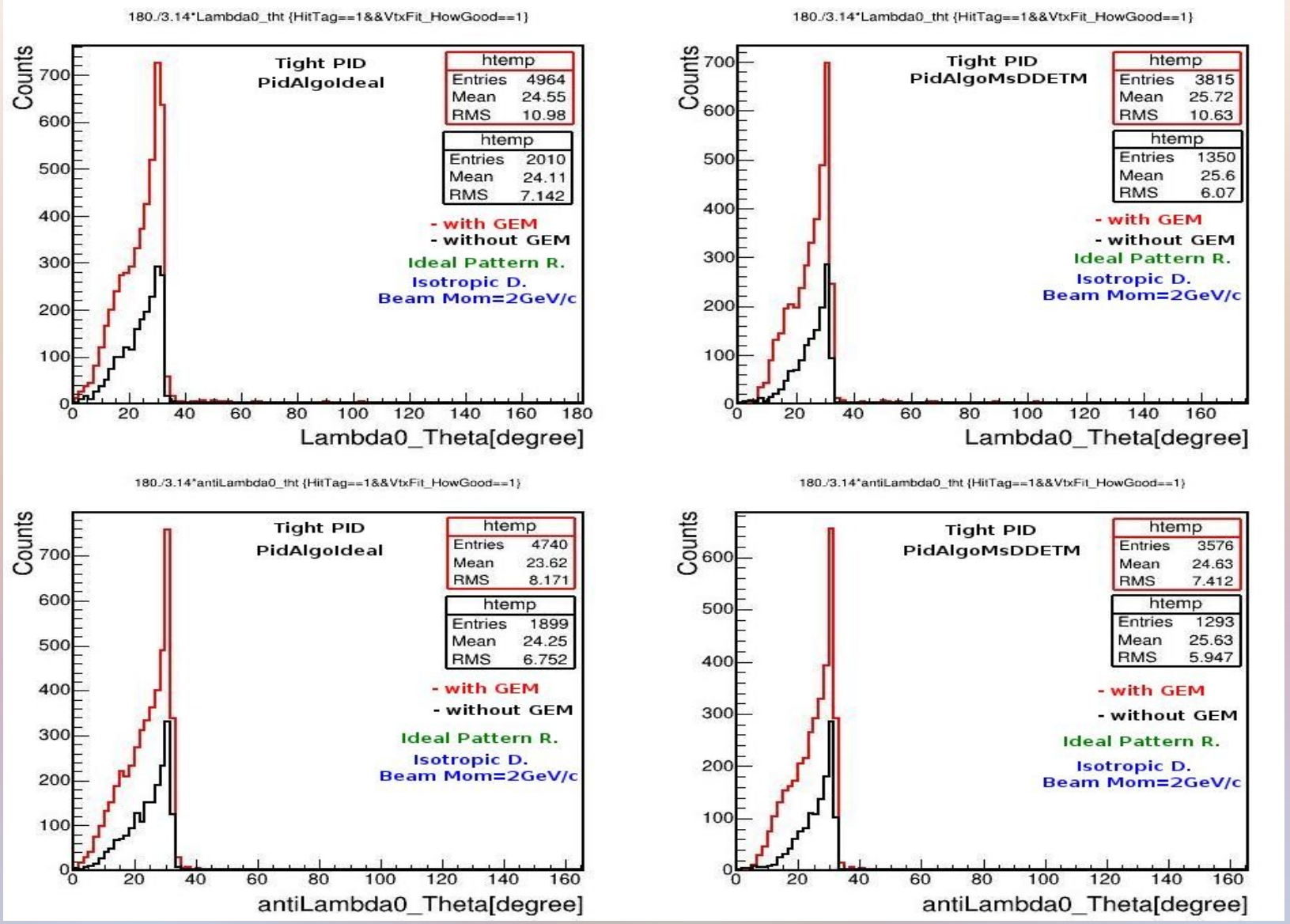








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