中国科学技术大学
University of Science and Technology of China

Isobar hypernuclei

2022/10/28

H3l embedding

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Request Type

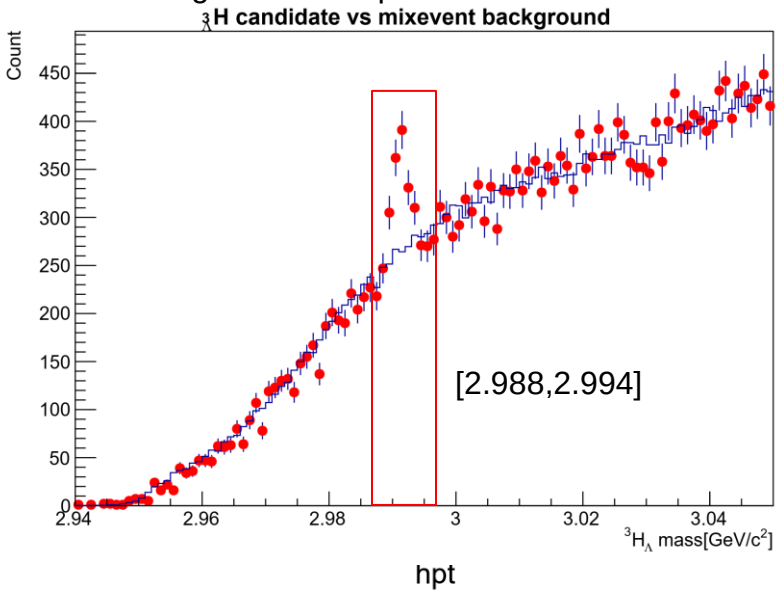
Standard Embedding request (particle in real events)

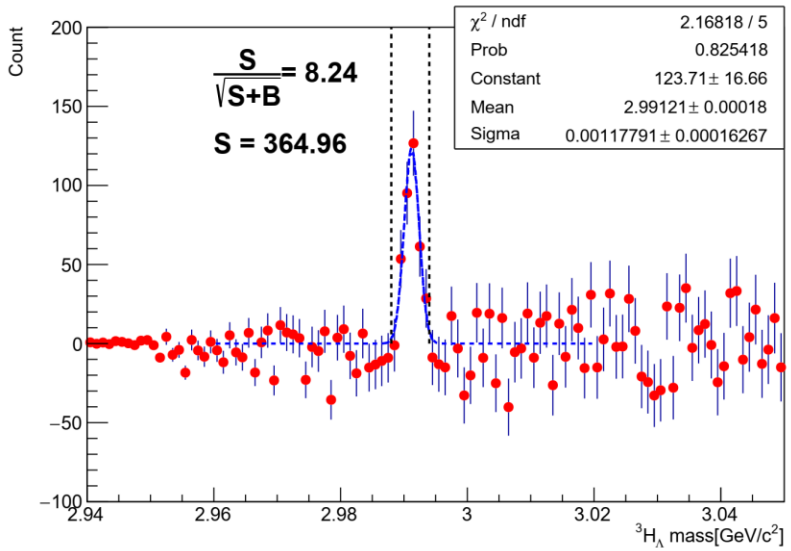
Description

- • Real Data: Isobar 200GeV Zr+Zr, Ru+Ru
- • Trigger Id = (350001 || 350011 || 350003 || 350013 ||350023 || 350033 || 350043 || 350505 || 350515 || 350502|| 350512 || 350503 || 350513 || 350504 || 350514 || 350501 || 350511 || 350507 || 350517 || 6 || 600601 || 600011 || 600021 || 600031 || 600012 || 600022 || 600032 || 600042)
- • Production Library: P20ic
- • Particle: (anti-)hyper-hydrogen3
- • Particles per event 5% mult
- • -60< VertexZ< 60 cm
- • -3.15< phi< 3.15 in radian, flat
- • -1.5< eta< 1.5, flat
- • 0.0< Pt< 8.0 GeV/c, flat → Add a weight to coincide with the real distribution before analysis

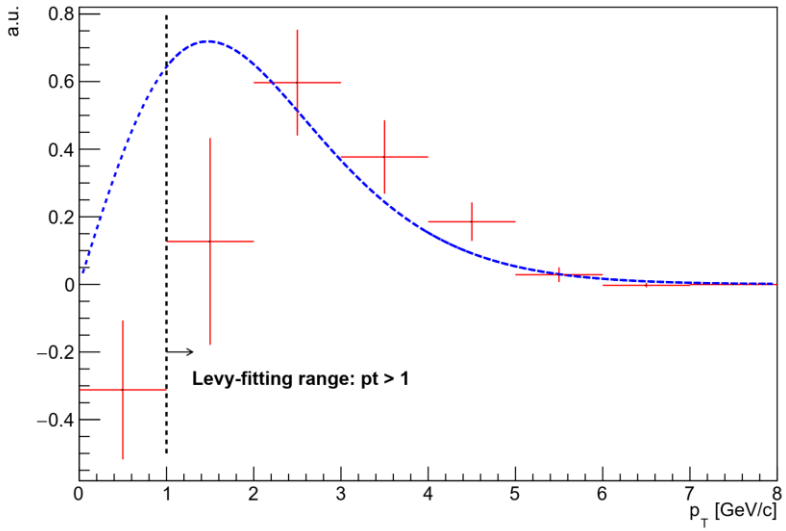
Raw mc vs pt-weighted raw mc

1. To investigate the real pt-distribution





hpt



(a) Must use a very strict mass cut when filling the pt histogram to avoid additional fluctuations.

(b) Different rebinnings are tried to get more points & less severe fluctuations.

(c) The negative point at low pt is not included in the analysis.

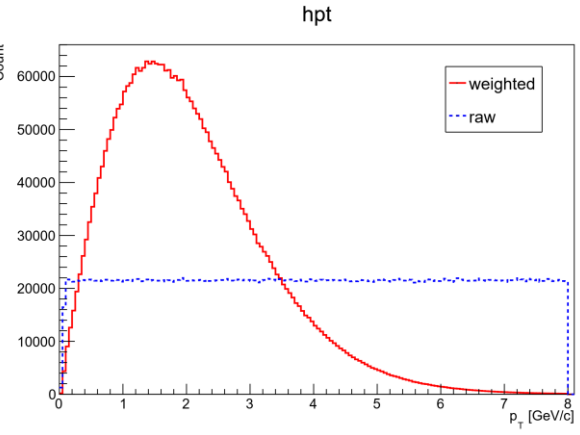
(d) The pt histogram is fitted with a Levy function.

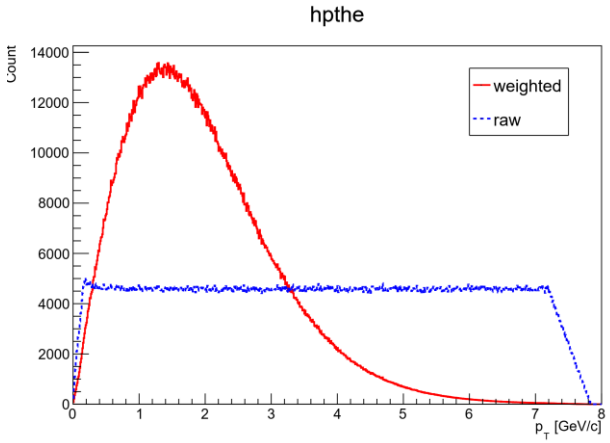
Raw mc vs pt-weighted raw mc

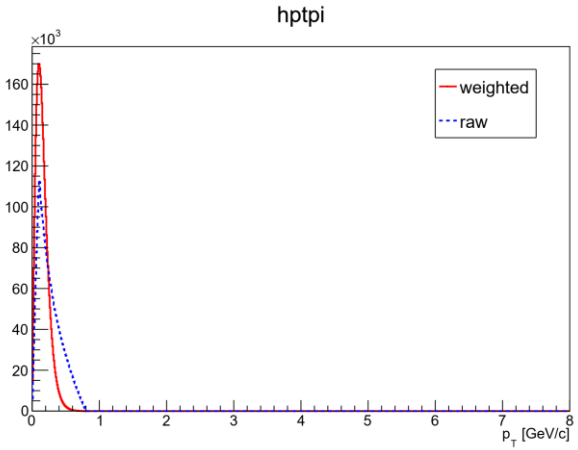
2. To add the pt weight and compare with the raw mc.

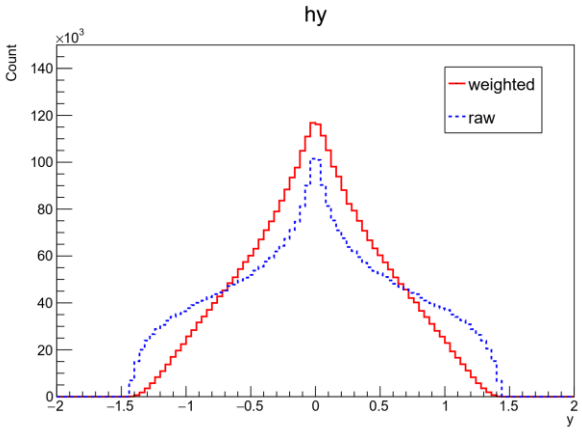
Raw mc: not acquiring the analysis topo cuts, all information(momentum, decay length…) are from mc

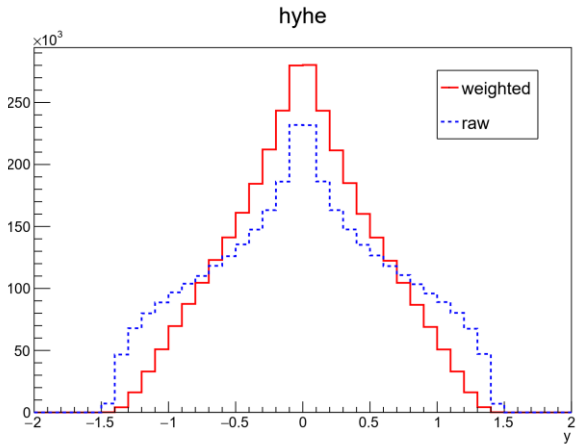
Pt-weighted mc: added a weight when filling the raw mc histogram

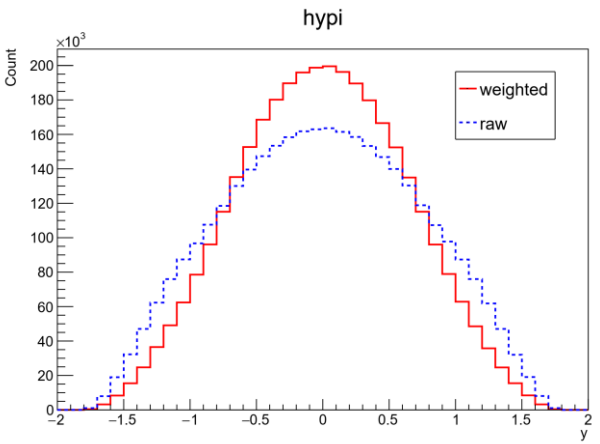












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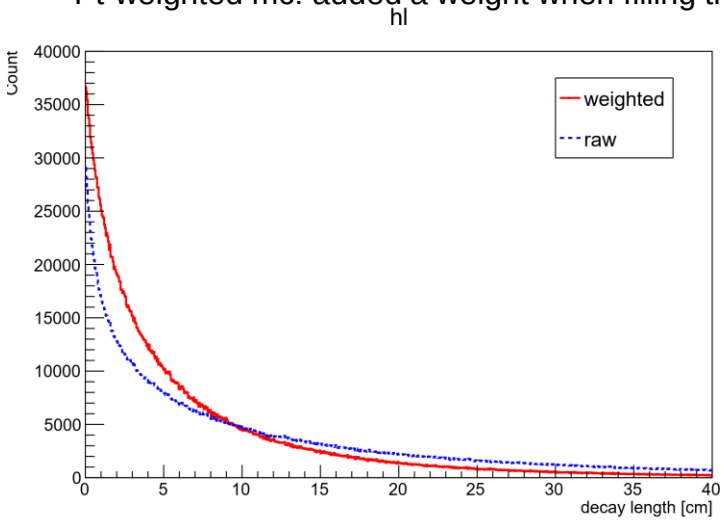

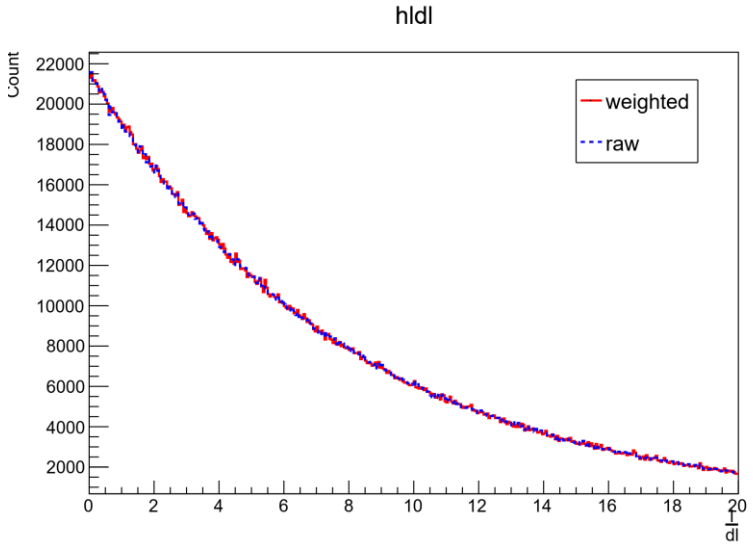

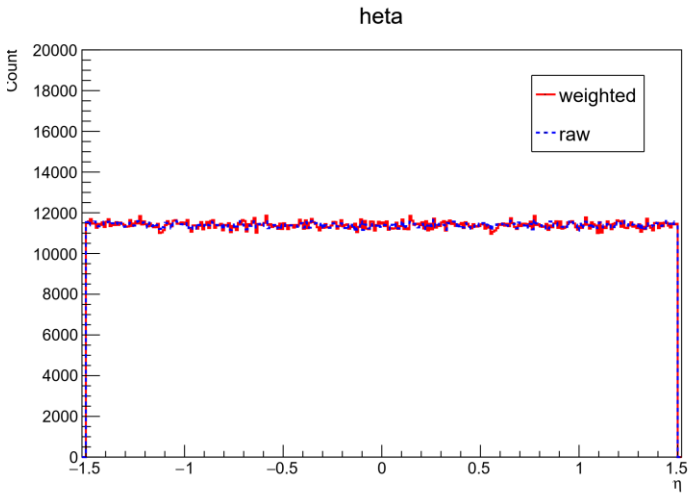

Data vs pt-weighted ana mc

To analyze the difference between real data and mc

Ana mc: acquiring the analysis topo cuts, all information(momentum, decay length…) are from trackers

Pt-weighted ana mc: added a weight when filling the ana mc histogram

KF Particle variable	Related helix method variable	Description
$\chi^2_{prim^{3/4}He}$	DCA of Helium	DCA of Helium over its error
$\chi^2_{prim\pi}$	DCA of $\pi^{\pm}$	DCA of $\pi^{\pm}$ over its error
χ^2_{ndf}	DCA 1 to 2	DCA between 2 daughter particle tracks over its error
χ^2_{topo}	DCA V0	DCA from mother particle to primary vertex over its error
l	-	decay length
ldl	-	decay length over its error

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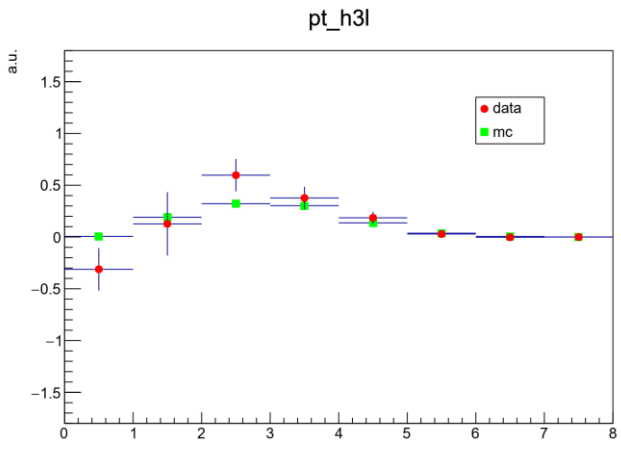

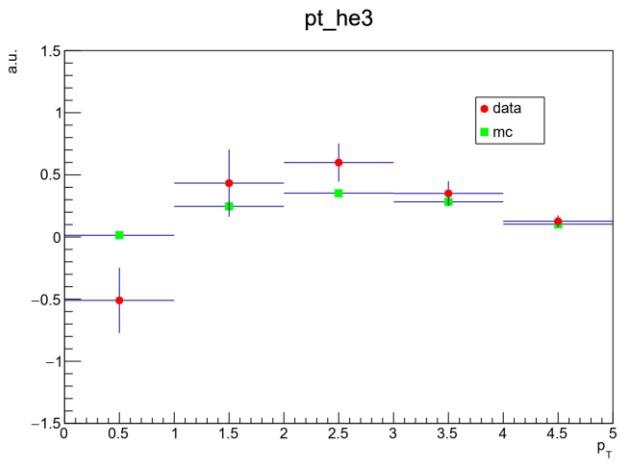

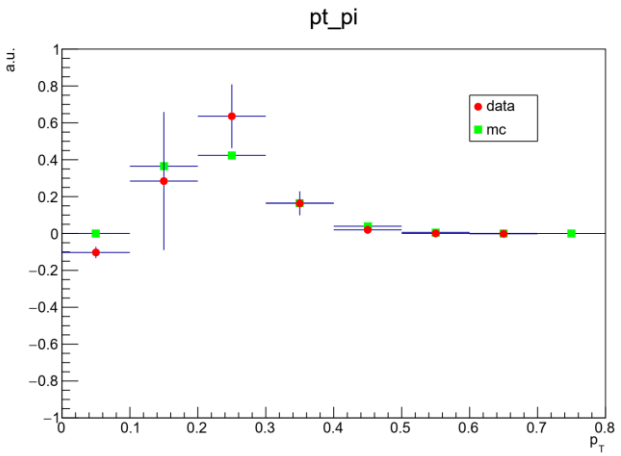

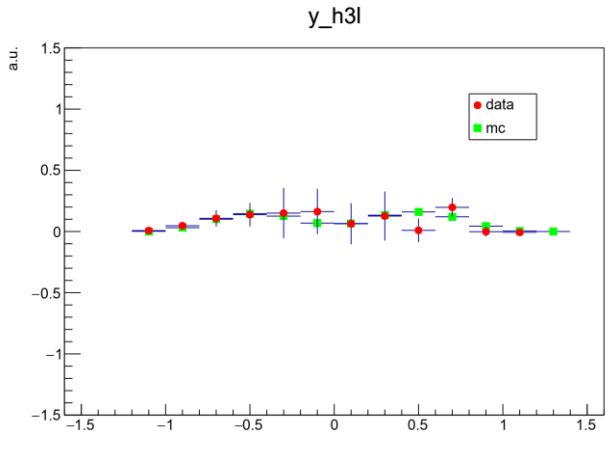

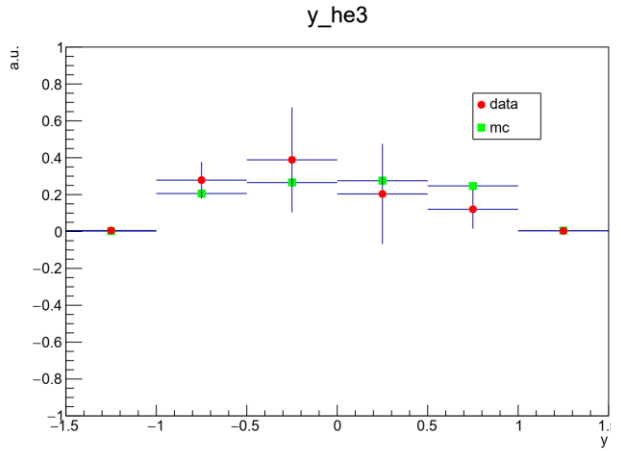

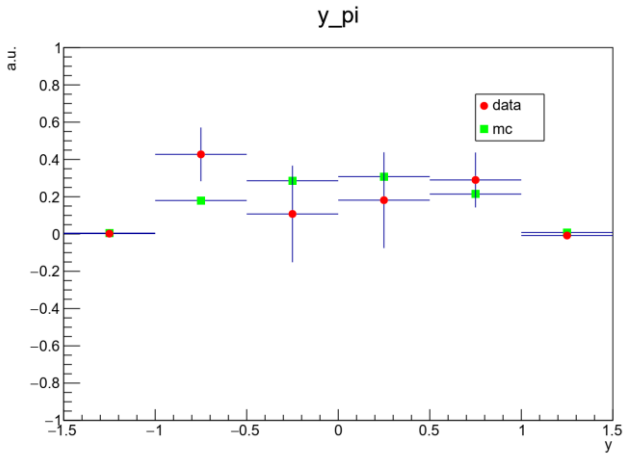

Data vs pt-weighted ana mc

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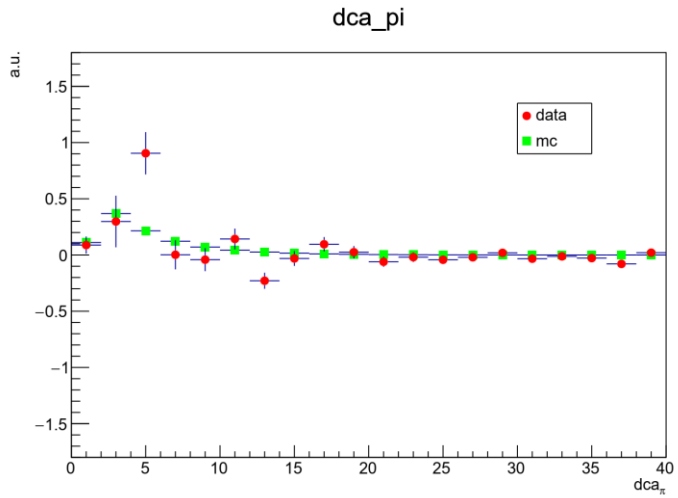
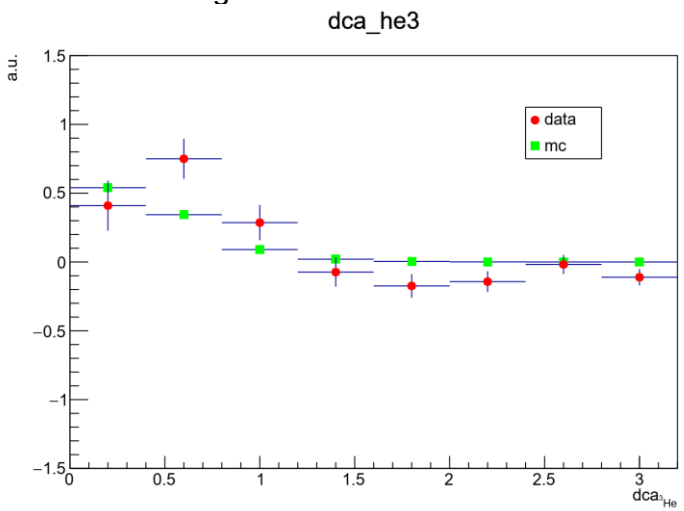
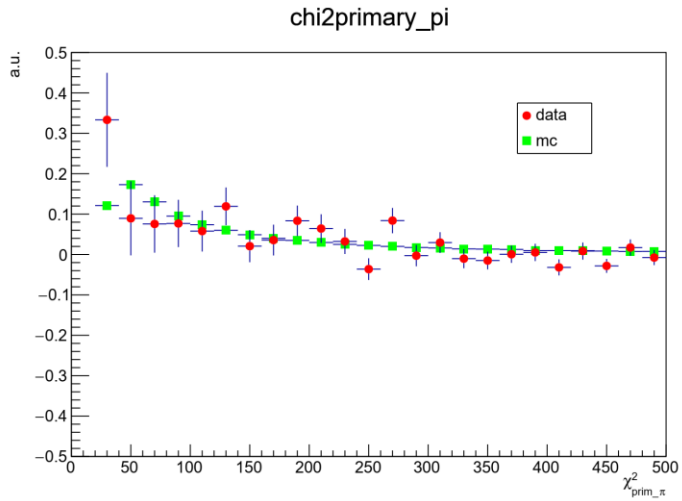
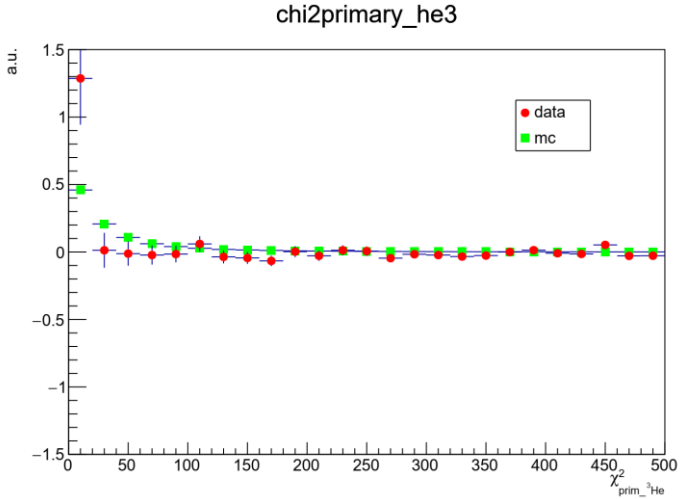
Pt-weighted ana mc: added a weight when filling the ana mc histogram









Data vs pt-weighted ana mc

To analyze the difference between real data and mc

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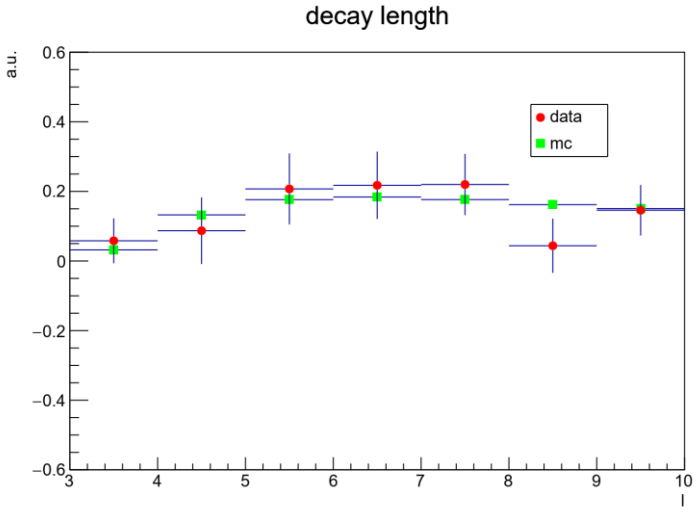
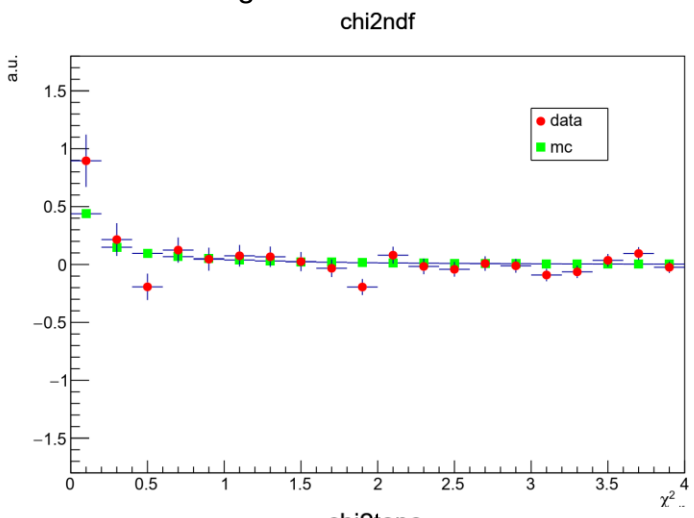
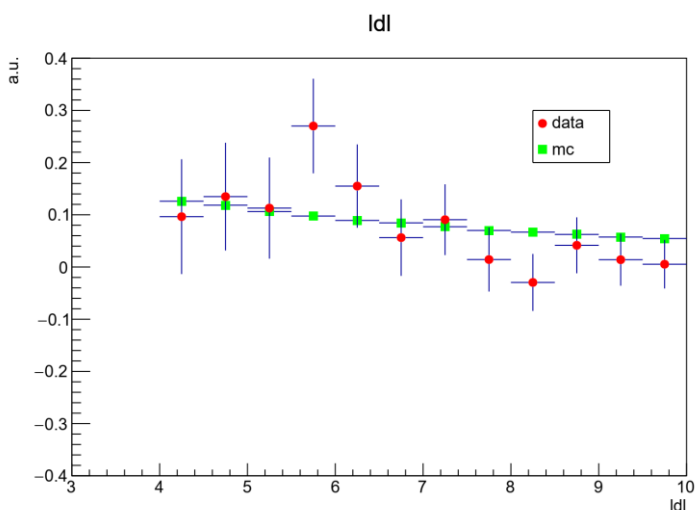
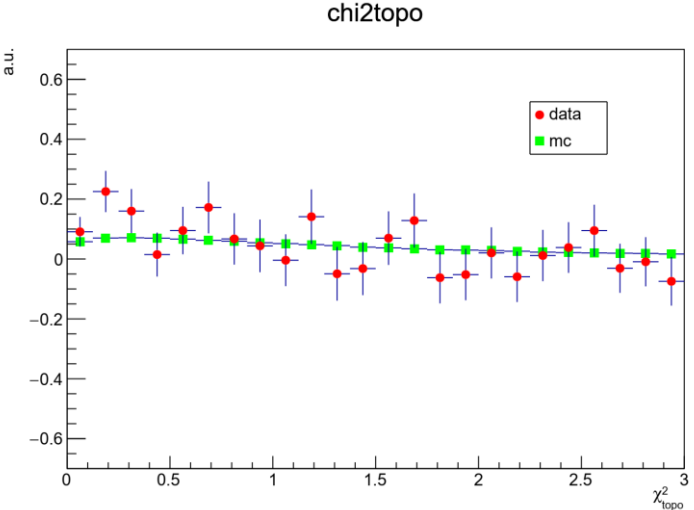




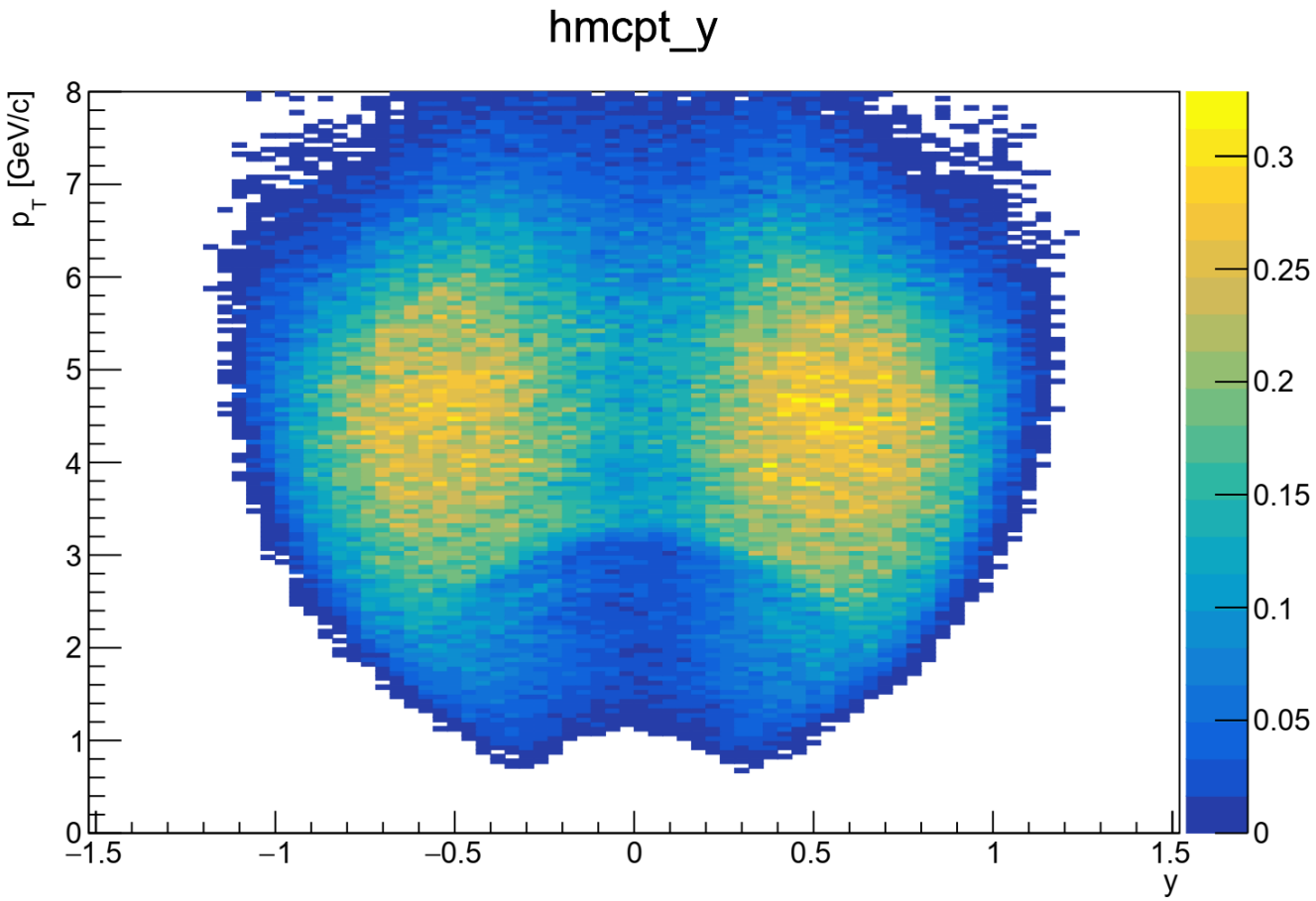




Efficiency vs (pt,y)

To analyze the efficiency as a function of (pt,y)

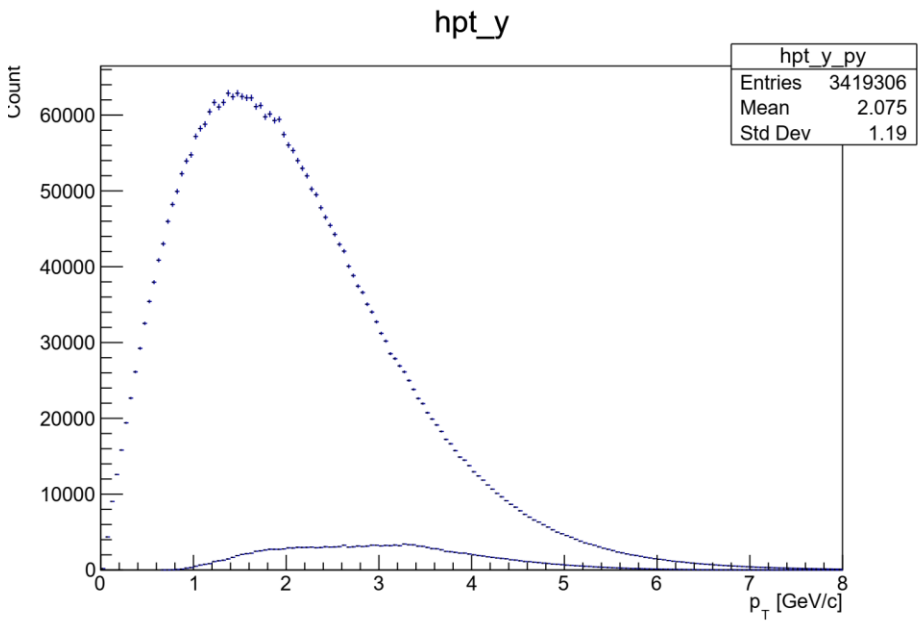
$$\text{Efficiency} = \frac{\text{Pt,y distribution from pt-weighted ana mc}}{\text{Pt,y distribution from pt-weighted raw mc}}$$

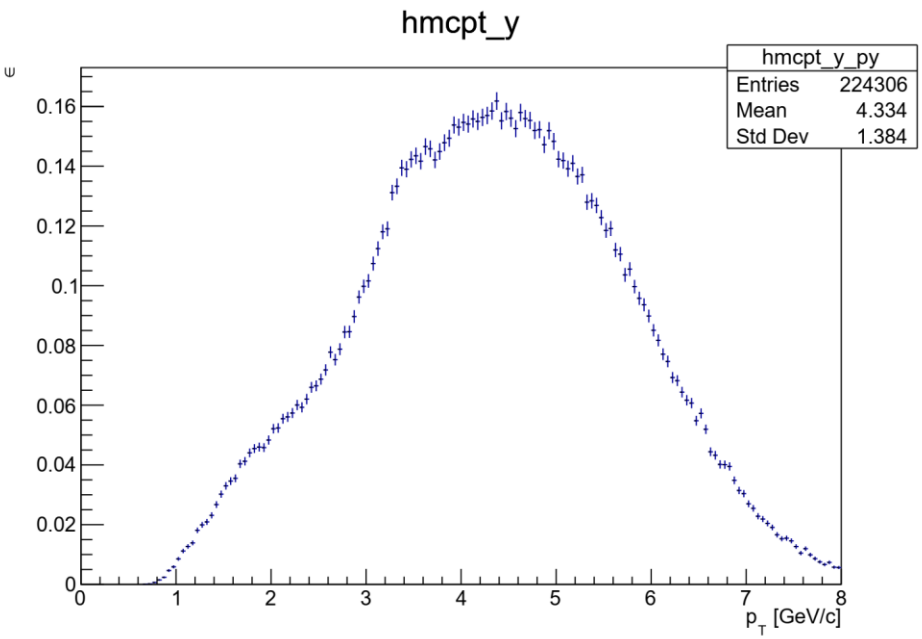


Efficiency vs pt

To analyze the efficiency as a function of pt

$$\text{Efficiency} = \frac{\text{Pt distribution from pt-weighted ana mc}}{\text{Pt distribution from pt-weighted raw mc}}$$





Efficiency vs y

To analyze the efficiency as a function of y

$$\text{Efficiency} = \frac{\text{y distribution from pt-weighted ana mc}}{\text{y distribution from pt-weighted raw mc}}$$