

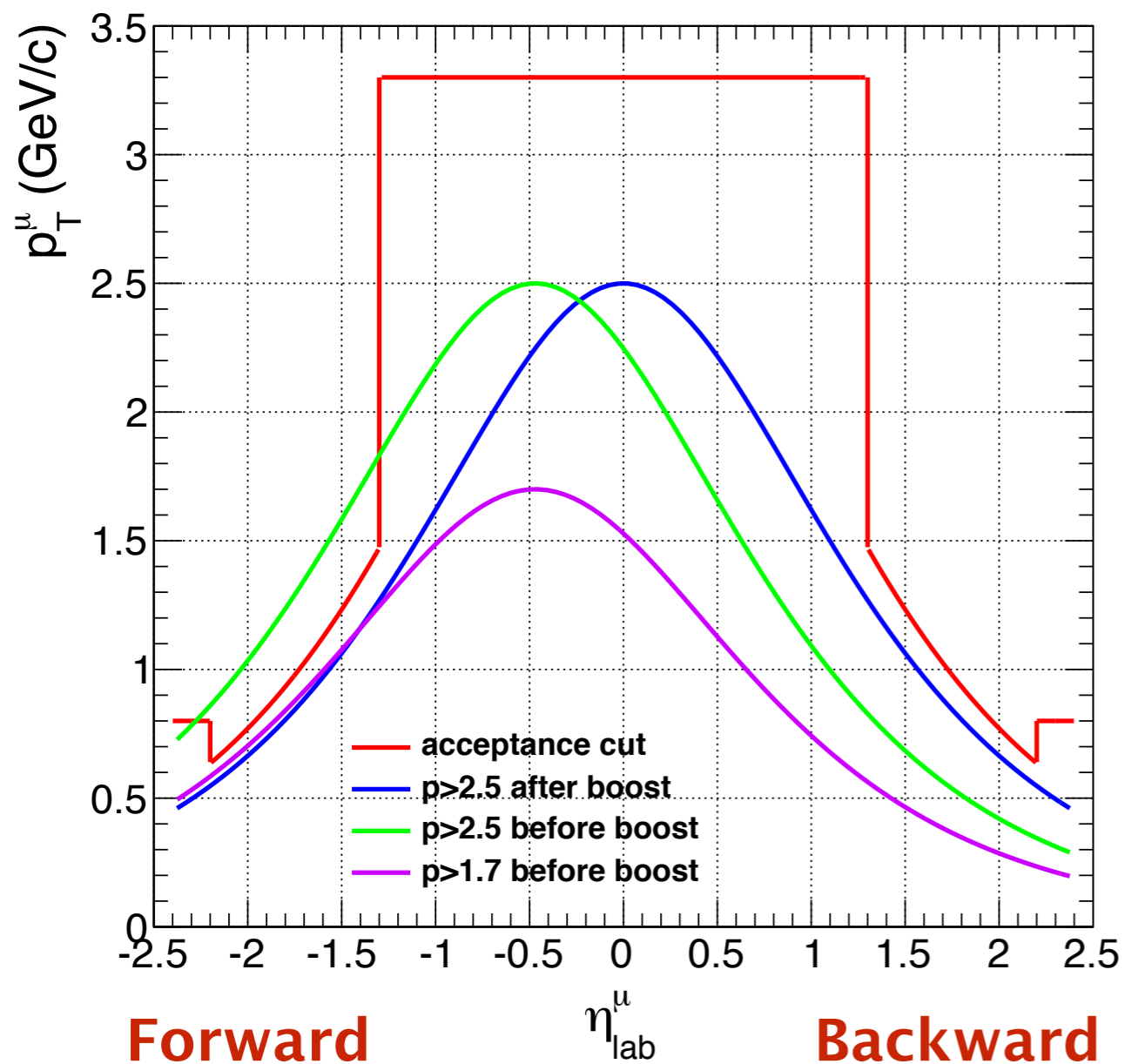
[HIN-14-009] embedded sample check



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Mihee Jo, Hyunchul Kim**



working meeting
9th January 2015



■ red :

actual single μ acceptance cut used in the analysis

- geometrical acceptance of detector $> 10\%$
- same with BPH group

$$\begin{aligned}
 |\eta^\mu| < 1.3 &\rightarrow p_T^\mu > 3.3 \text{ GeV}/c \\
 1.3 < |\eta^\mu| < 2.2 &\rightarrow p_T^\mu > 2.9 \text{ GeV}/c \\
 2.2 < |\eta^\mu| < 2.4 &\rightarrow p_T^\mu > 0.8 \text{ GeV}/c
 \end{aligned}$$

■ Green :

- filter $p > 2.5$ GeV/c **before** the boost
- previous wrong official sample

■ Blue :

- filter $p > 2.5$ GeV/c **after** the boost
- official pythia sample requested
- private pythia sample

■ Violet :

- filter $p > 1.7$ GeV/c **before** the boost
- 2 times larger events needed compared to blue
- private HIJING embedded sample



official MC status



- Our pull request has been made
(to add the customization to flip the sequence of the boost and the filter)
- It will be included in the next CMSSW 53X release.
- Mihee – validation in CMSSW_5_3_X_2015-01-04-0200
 - * previous : `--beamspot Realistic8TeVCollisionPPbBoost`
 - * now : `--beamspot Realistic5TeVCollisionPPbBoost`

Ⓜ e.g.) prompt MC with 1st run direction

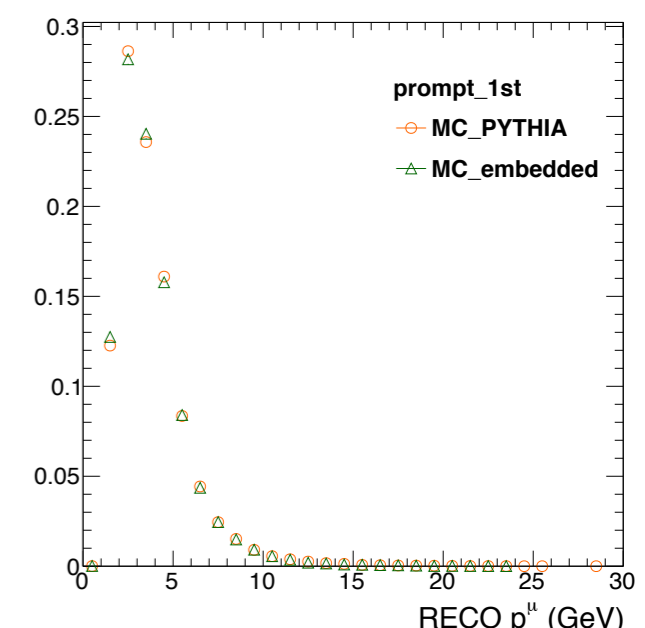
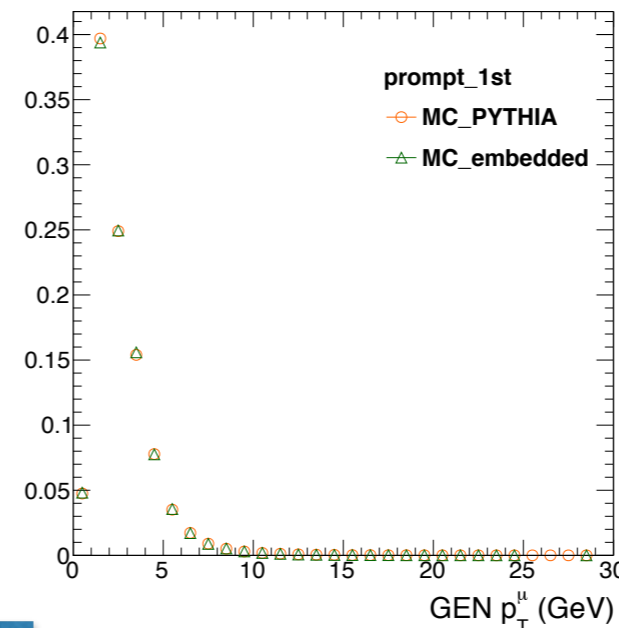
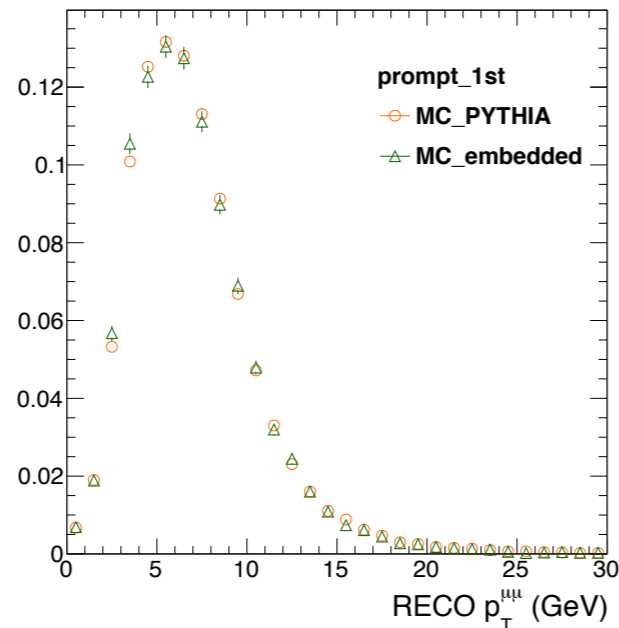
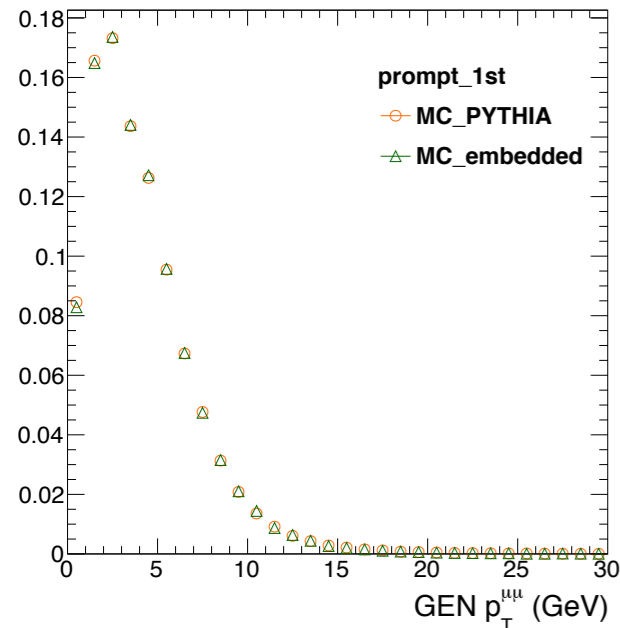
other samples on back-up

■ GEN dimuons

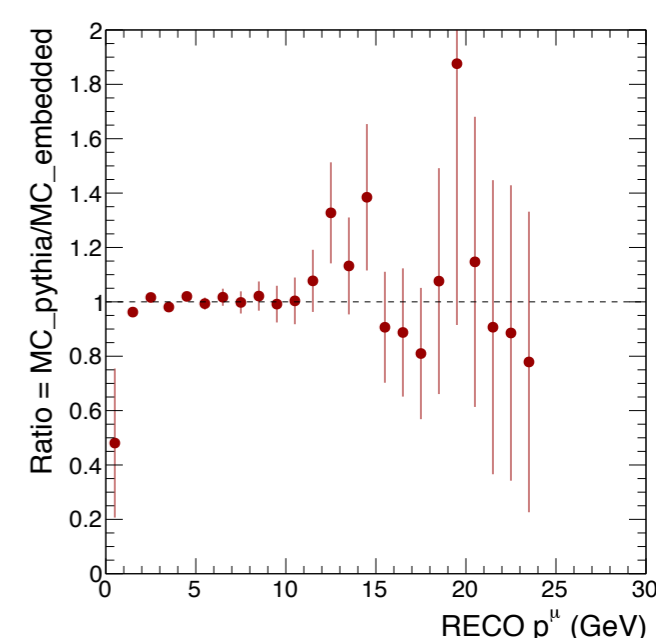
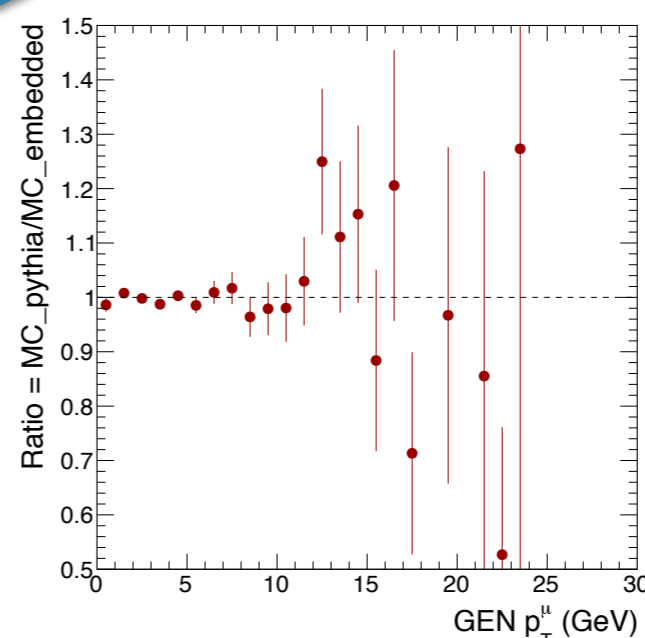
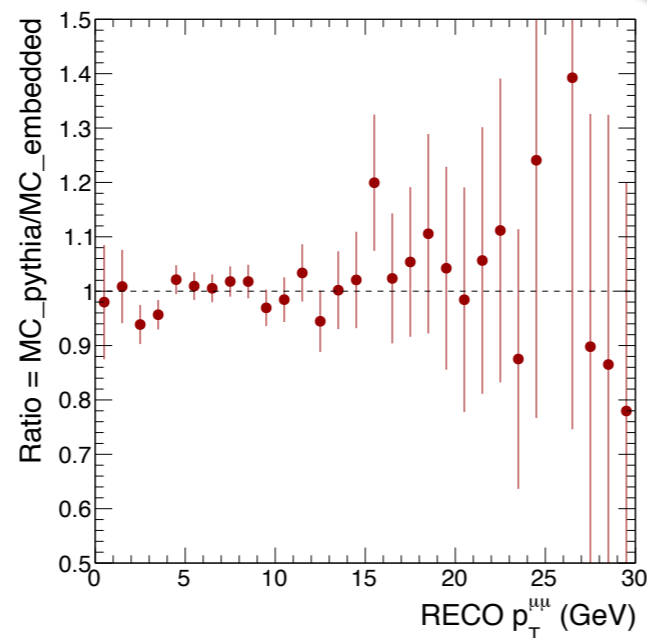
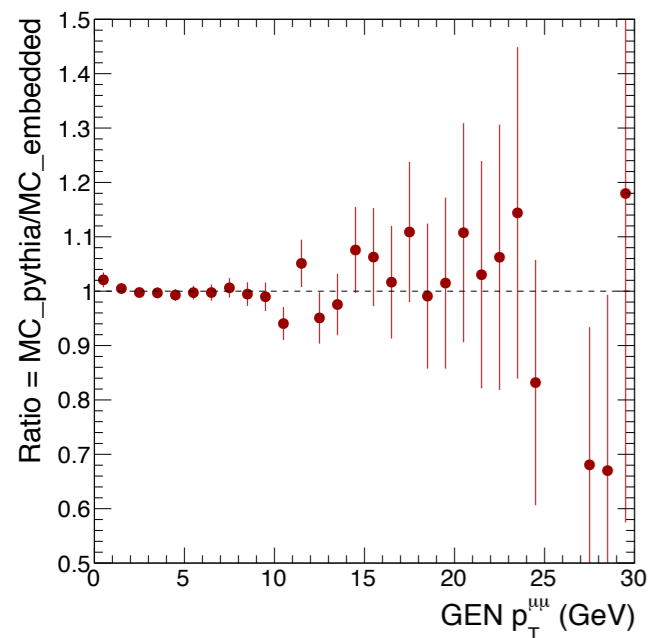
■ RECO dimuons

■ GEN single muons

■ RECO single muons



■ Ratio = pythia / embedded

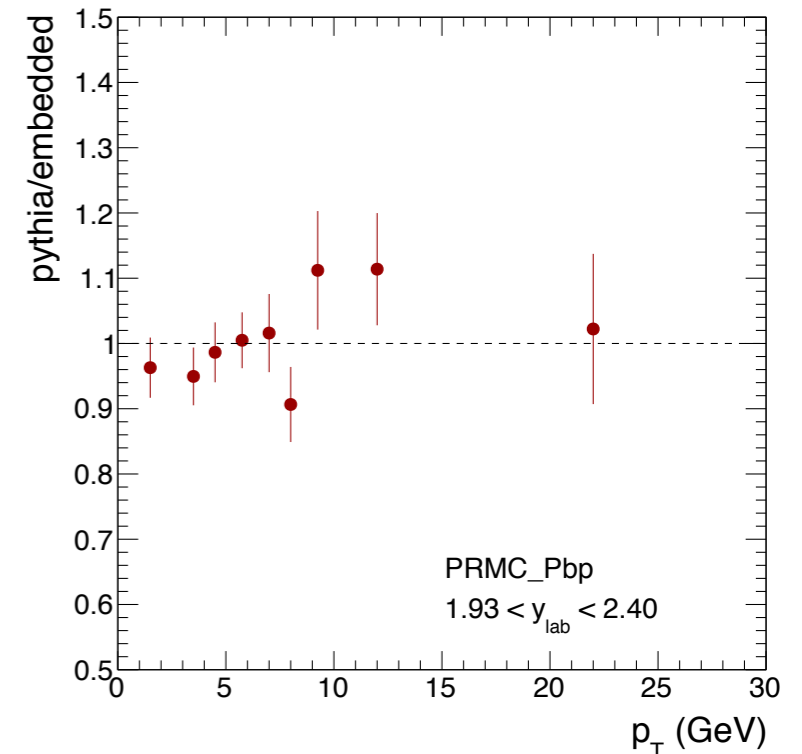
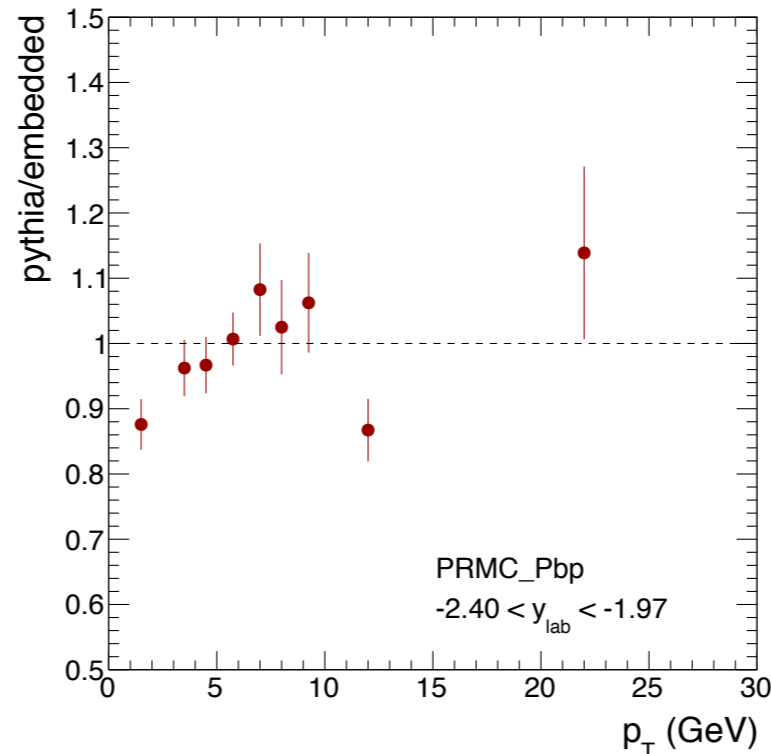
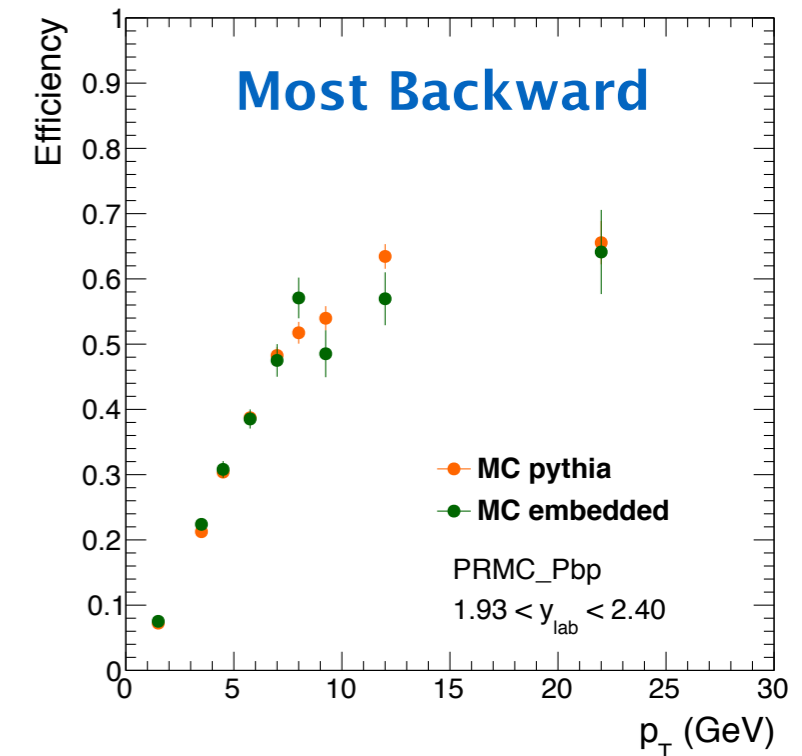
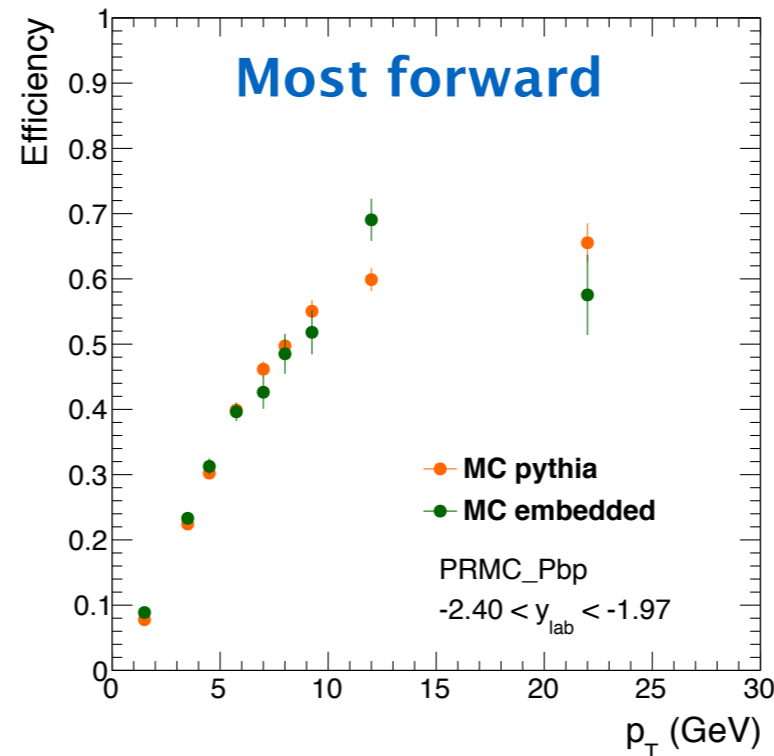


■ Overall, pure pythia and embedded samples agree well

Ⓜ e.g.) prompt MC with 1st run direction

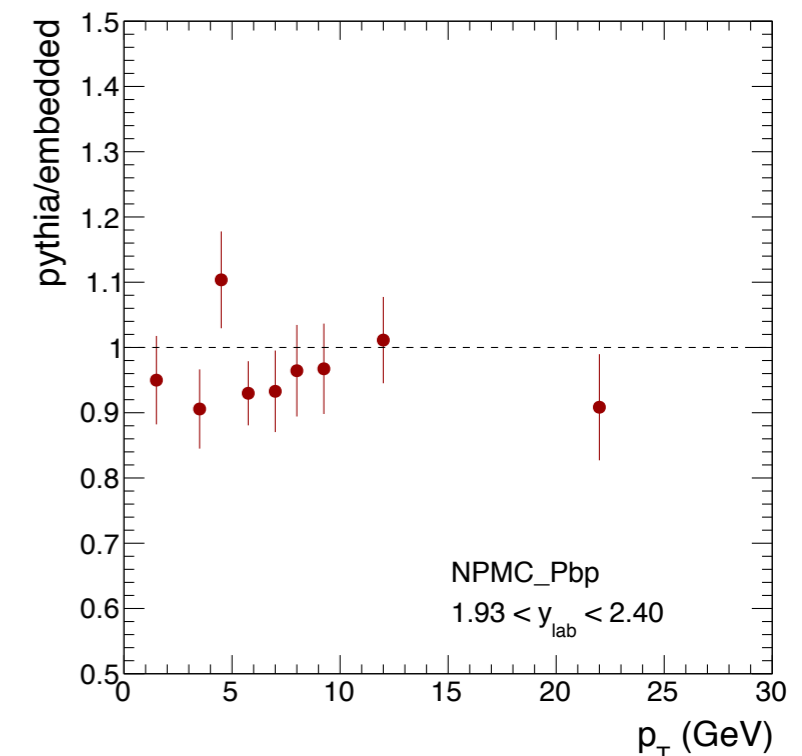
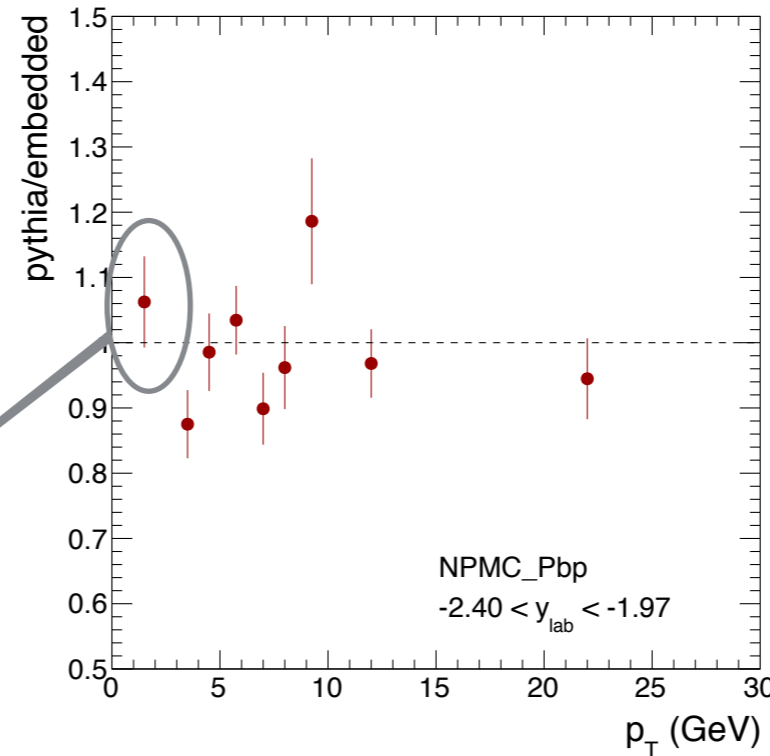
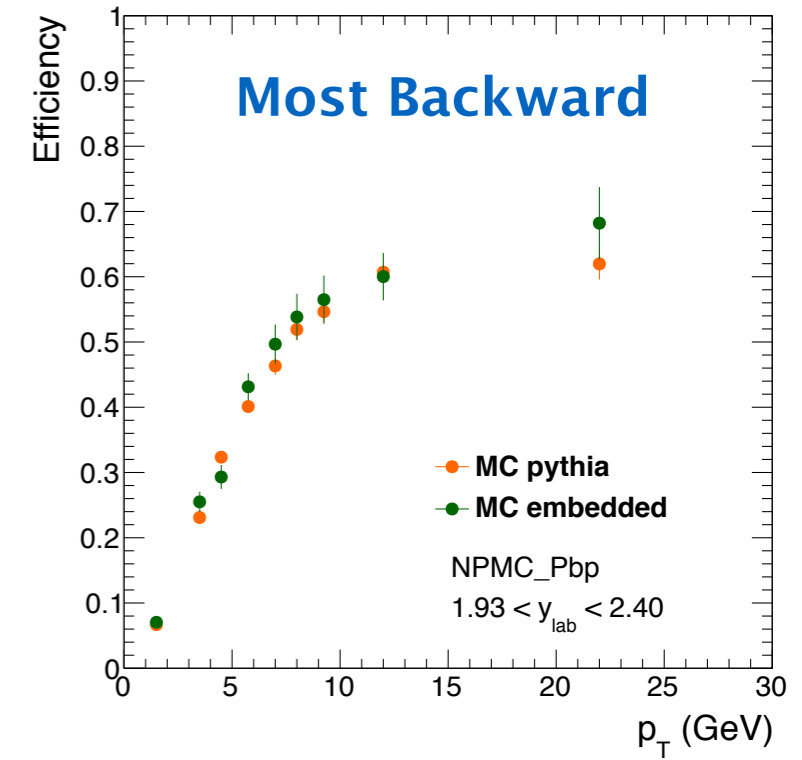
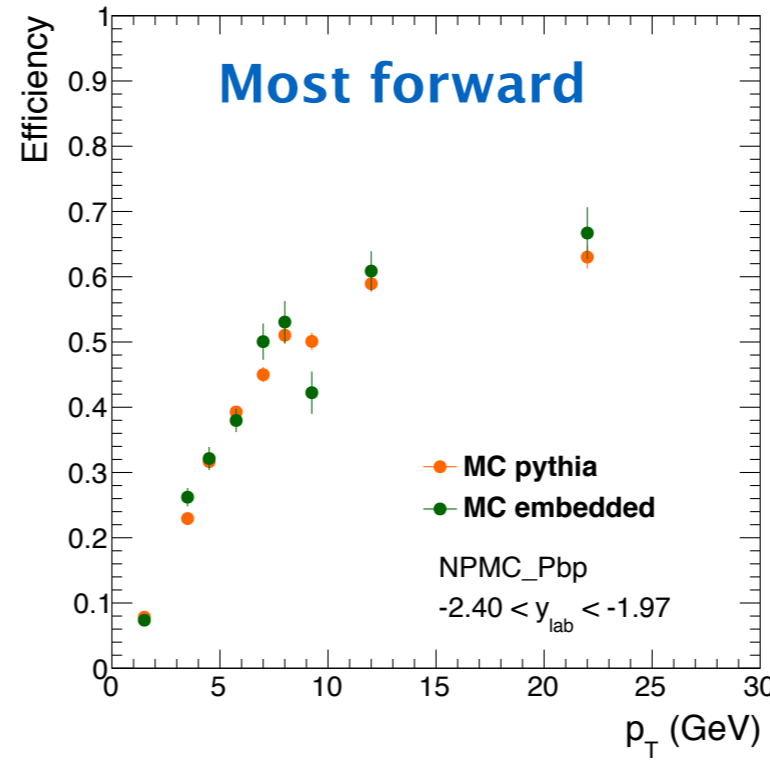
- Most forward/backward bins where we go down to $p_T \sim 0$ GeV/C.

other samples & all rapidity ranges on back-up



- Efficiency values are also similar
- Difference will be also reflected in TNP.

Ⓜ e.g.) non-prompt MC with 1st run direction



■ Different from prompt J/psi

Ⓜ Monte Carlo

- For official samples, we will stick to pure pythia.
 - 1) No big difference between pythia sample and embedded one.
 - 2) For signal extraction, we need pure pythia samples for ctau template.

Ⓜ finalize results and systematic uncertainties

Ⓜ Update AN and contact to ARC



dimuons GEN



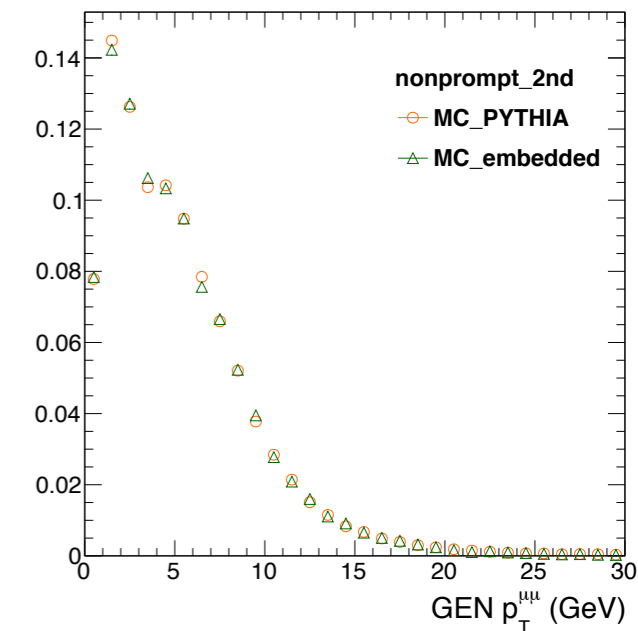
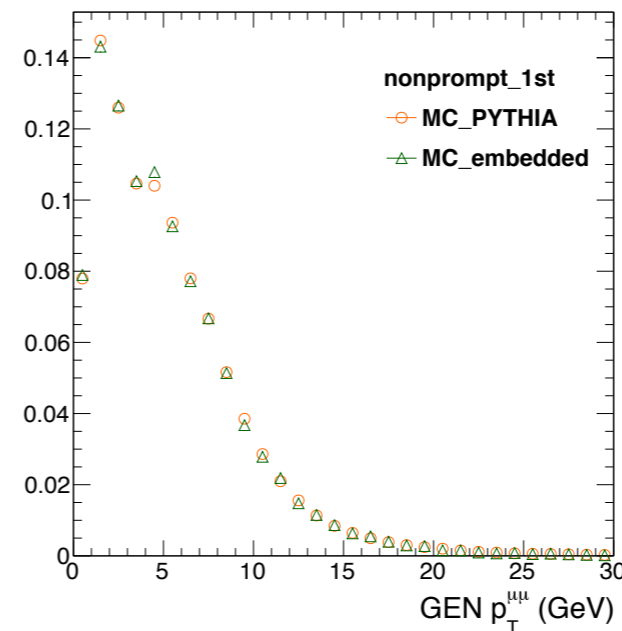
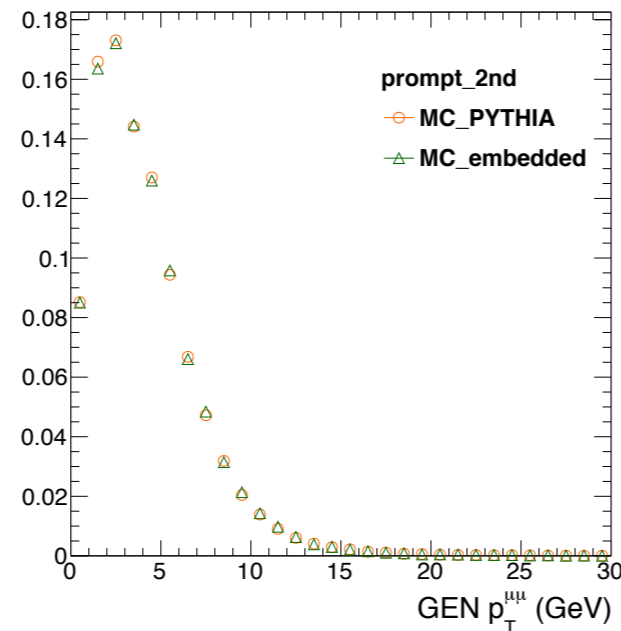
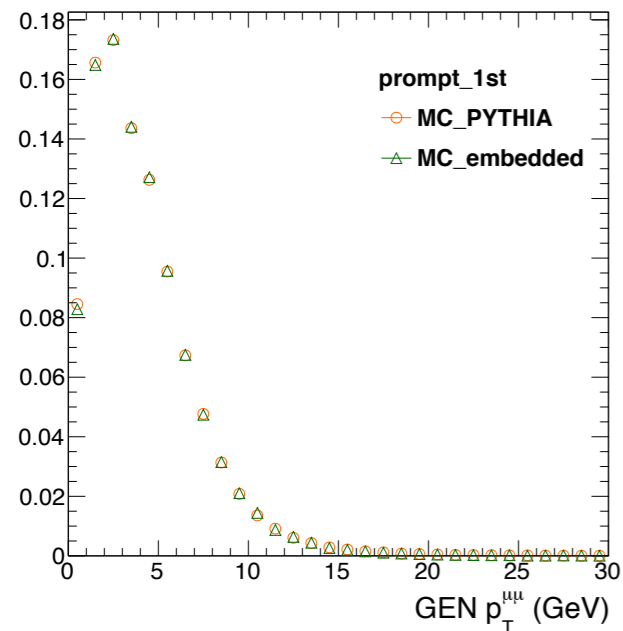
Back up



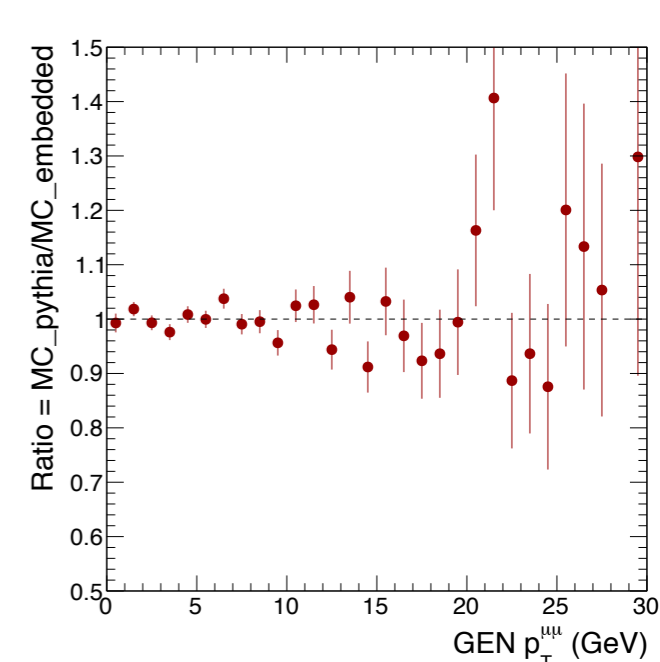
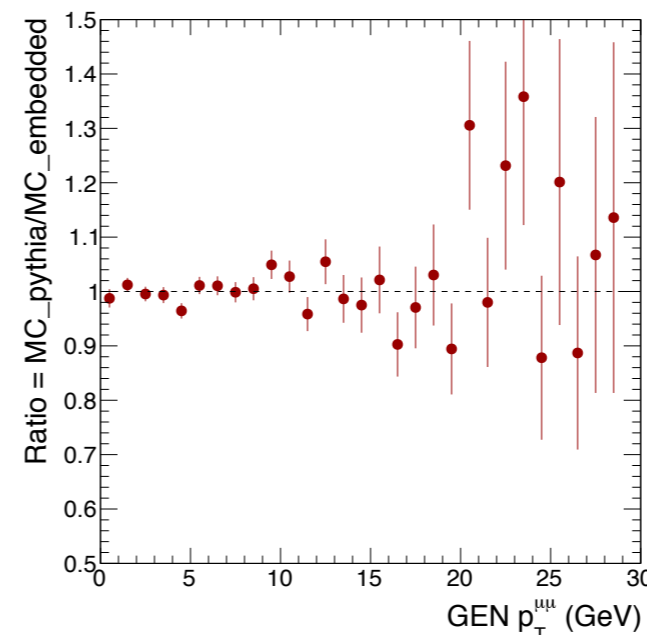
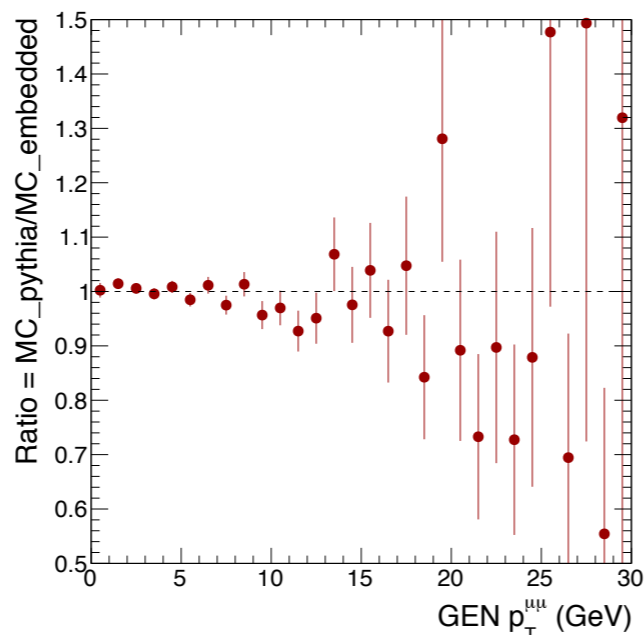
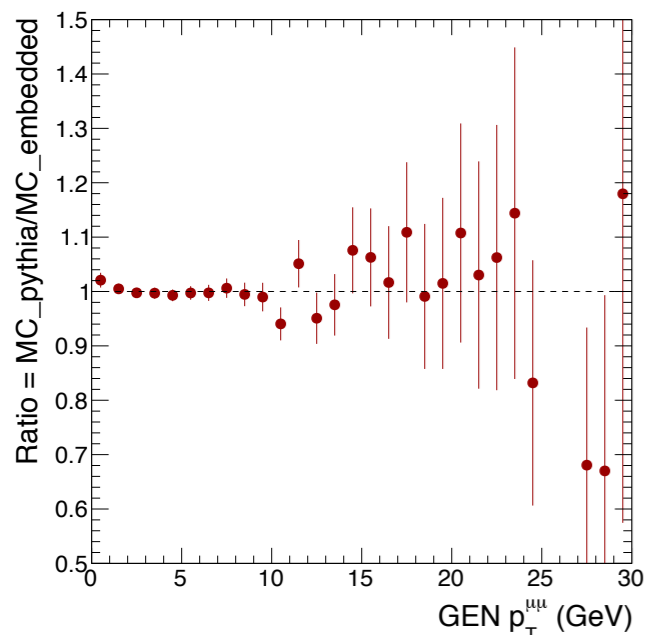
pythia vs embedded - p_T distributions

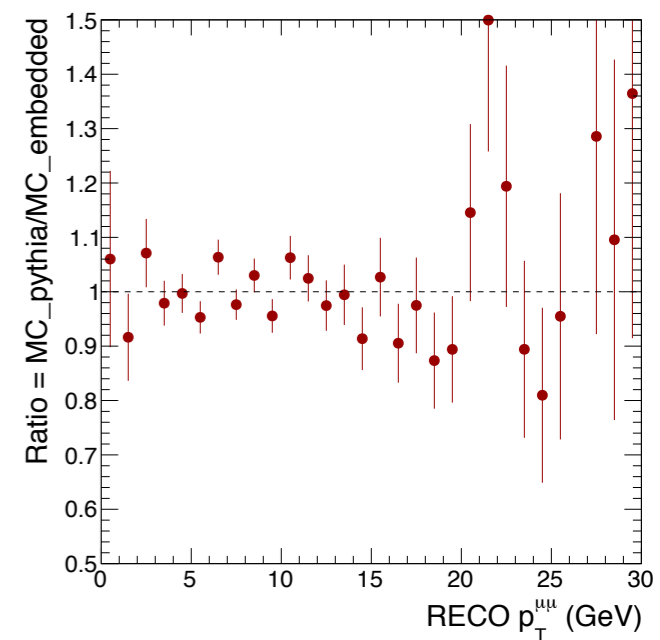
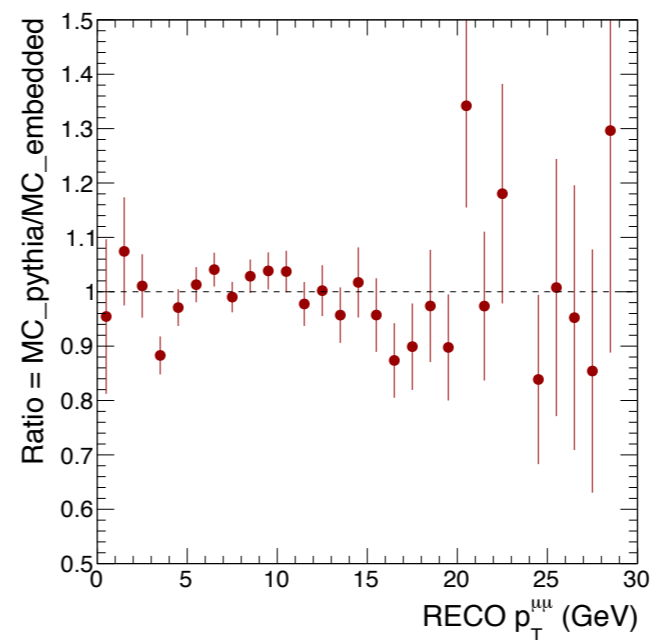
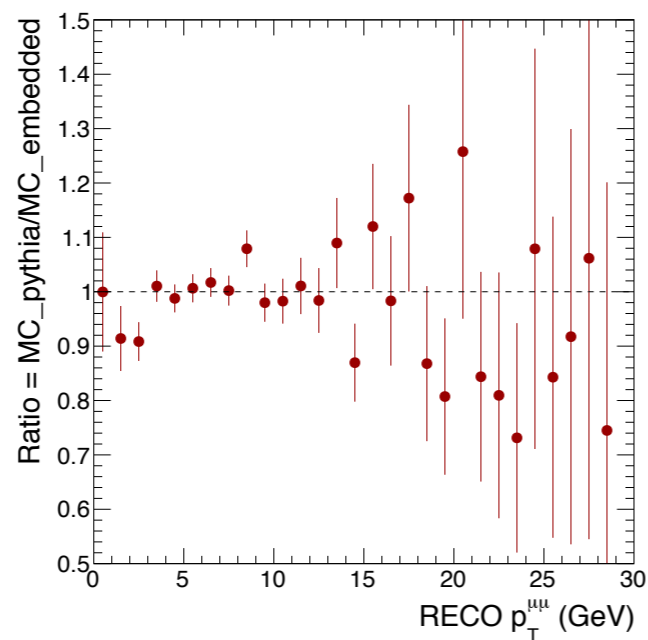
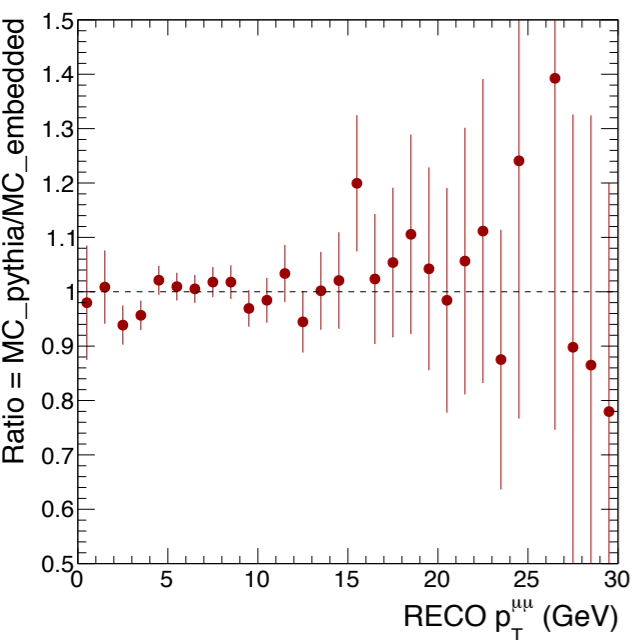
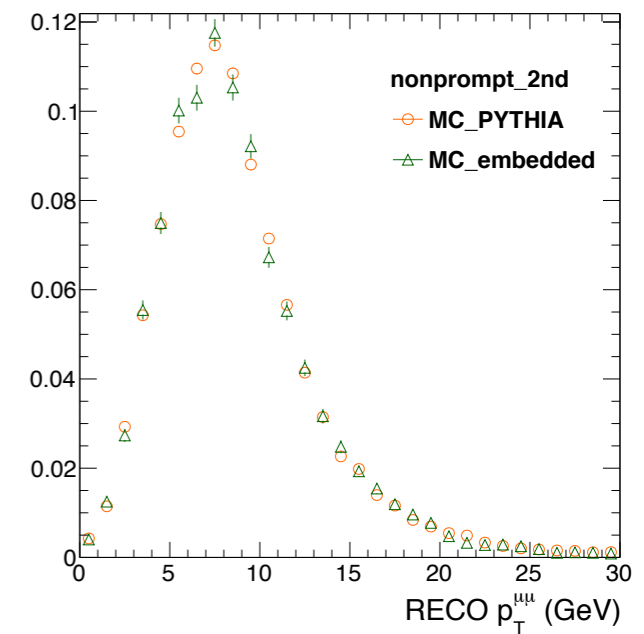
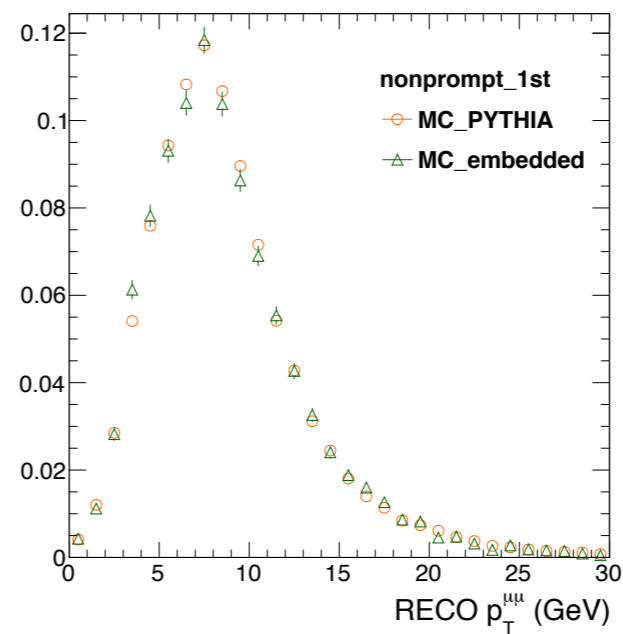
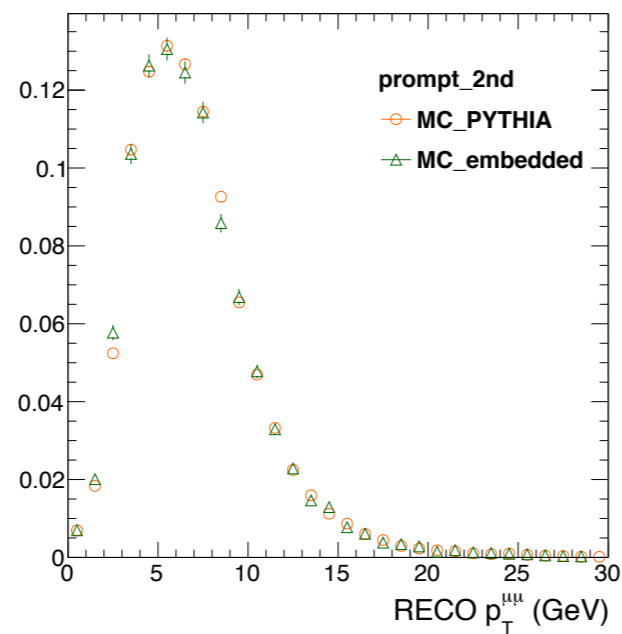
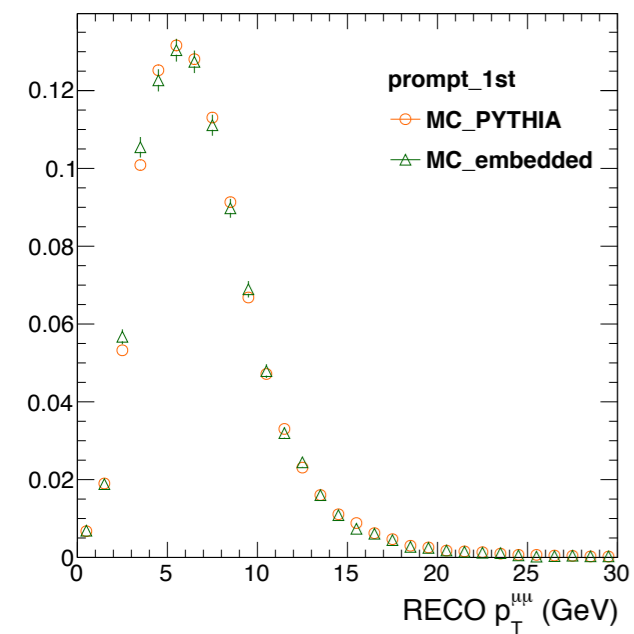
zVtx Weight & cut done

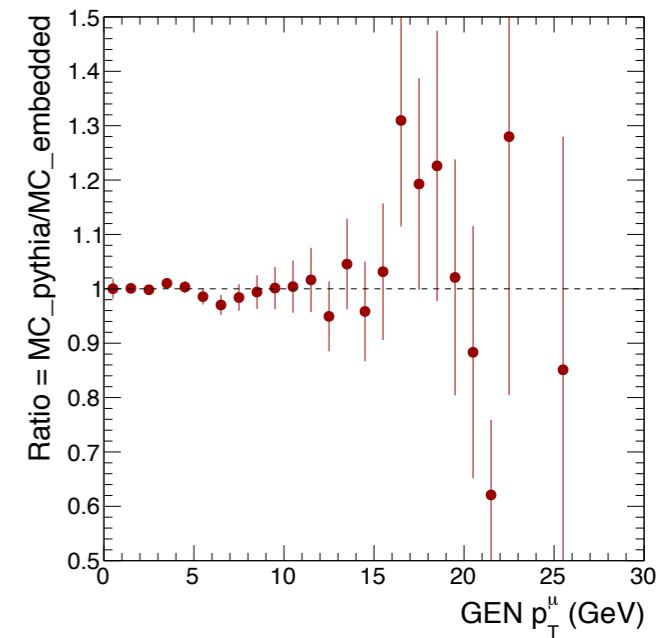
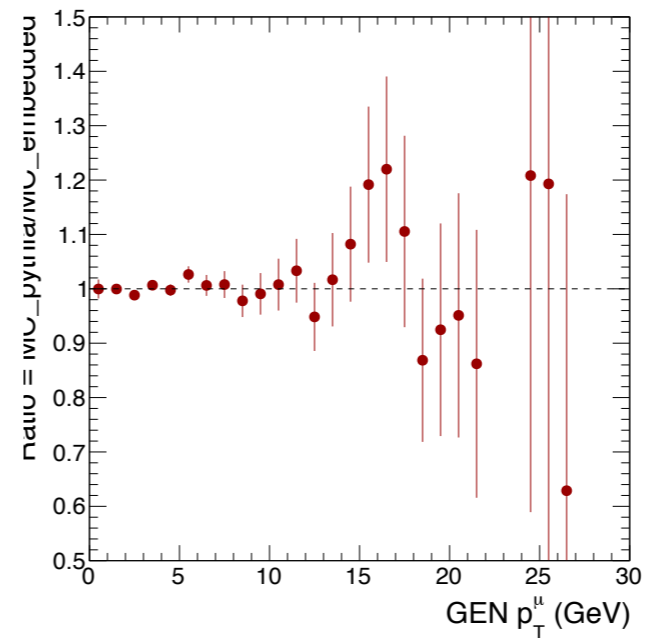
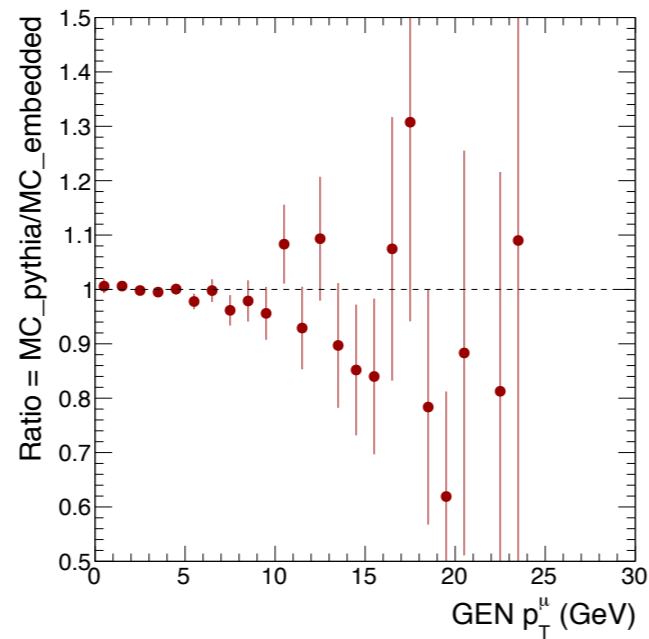
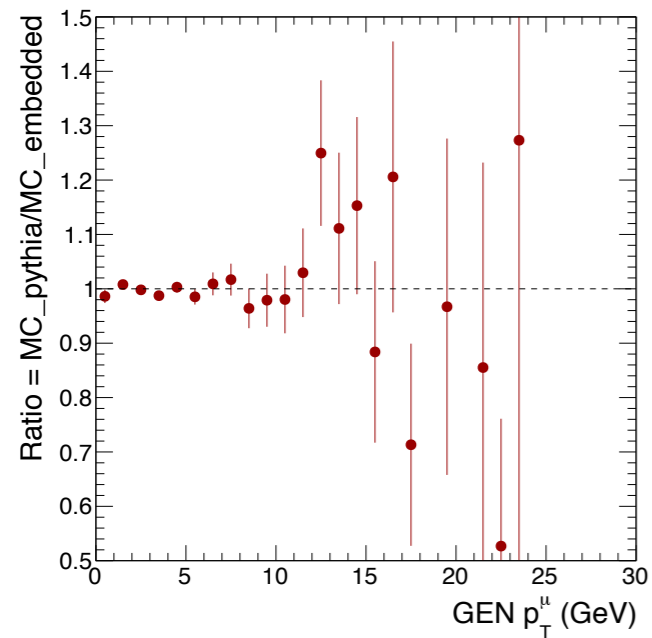
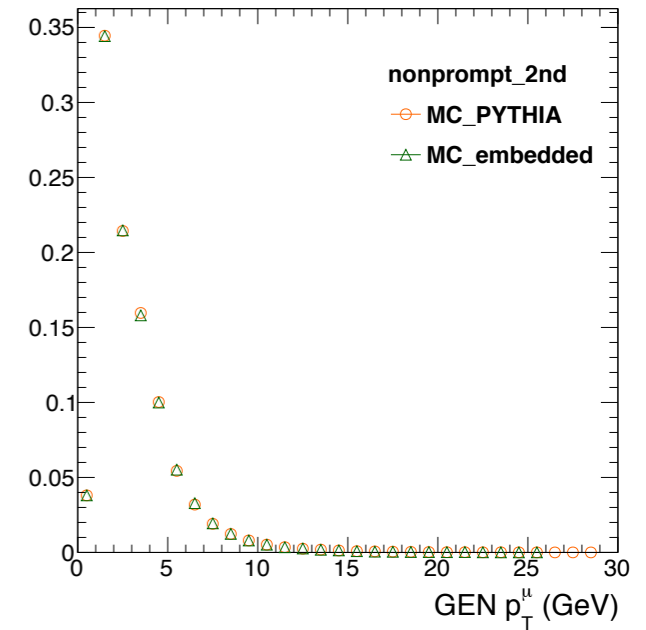
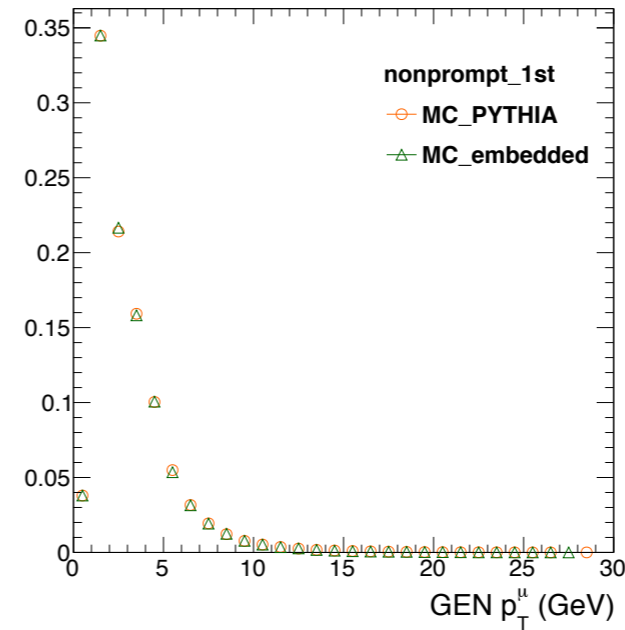
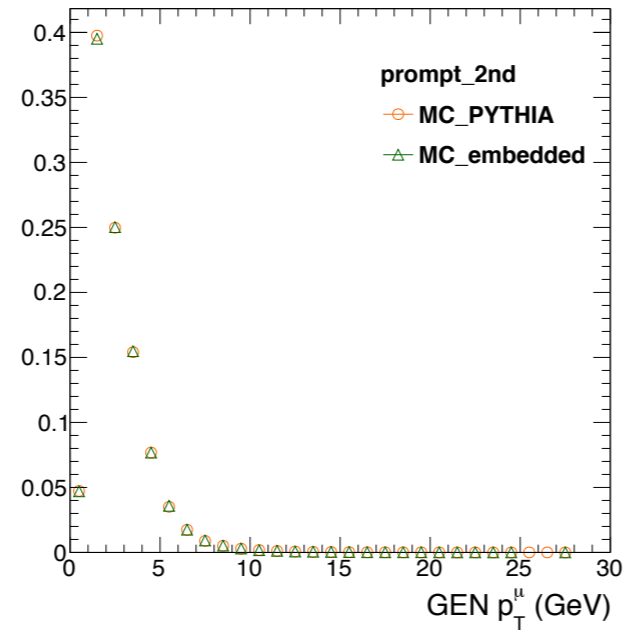
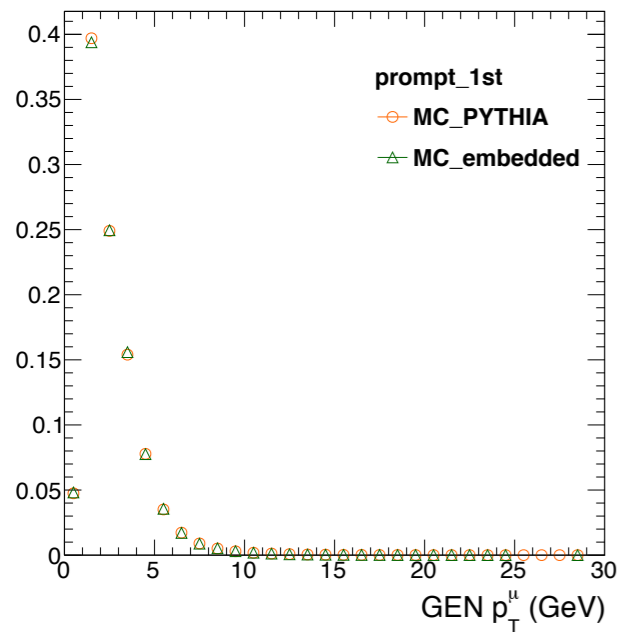
■ pT distributions after acceptance cut applied

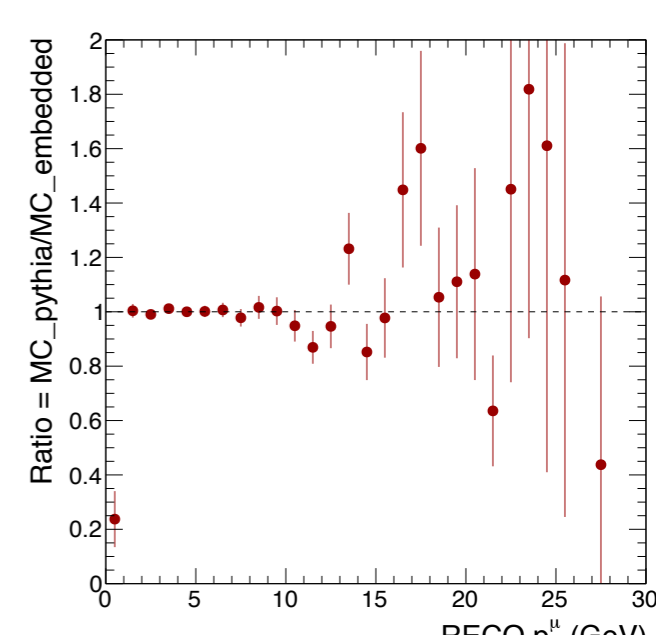
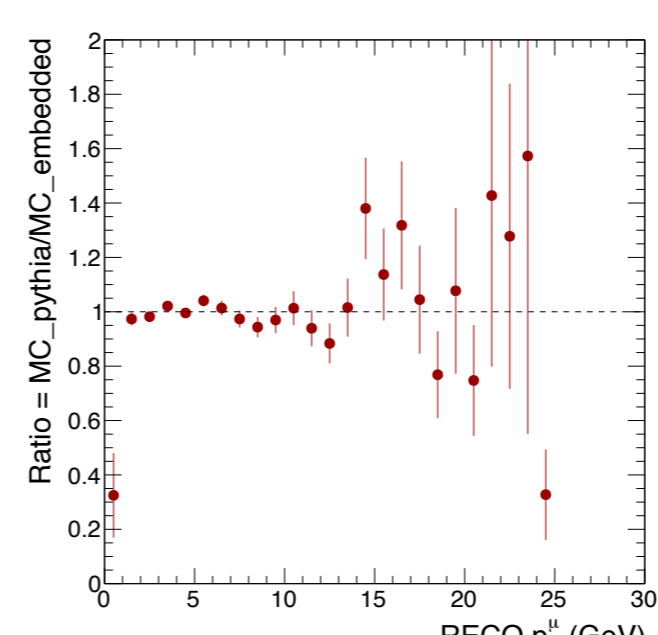
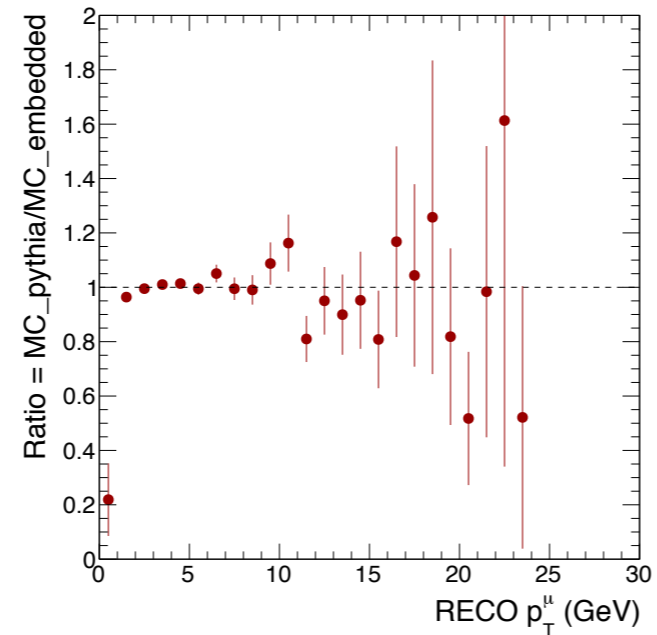
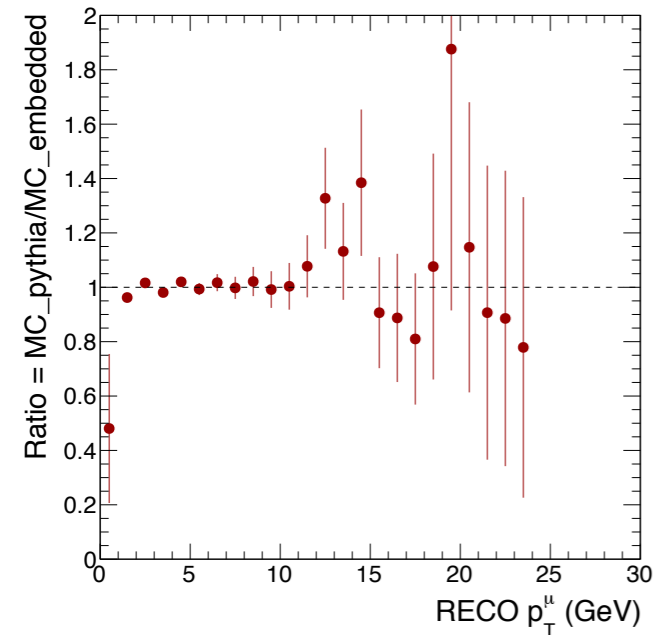
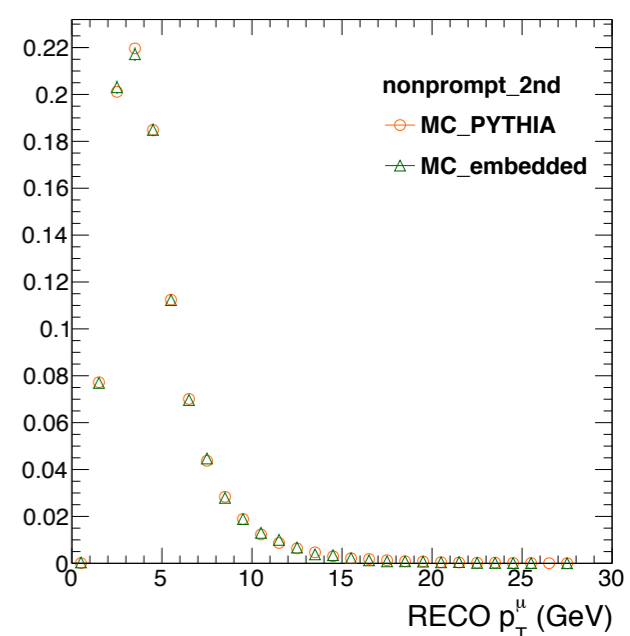
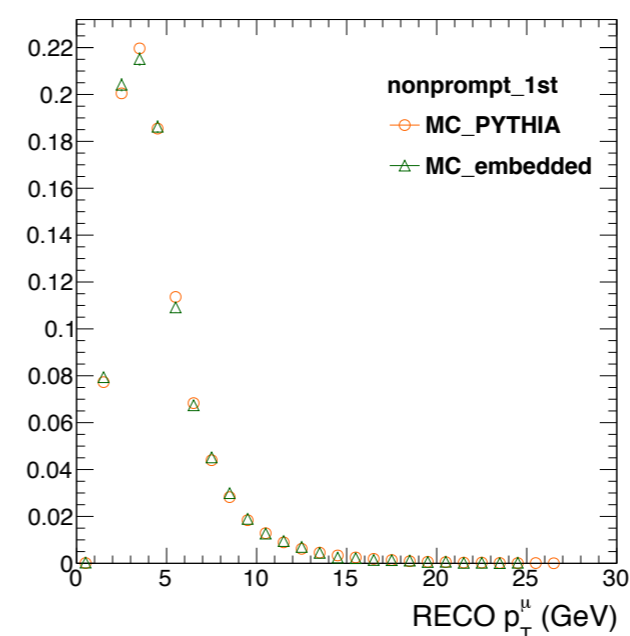
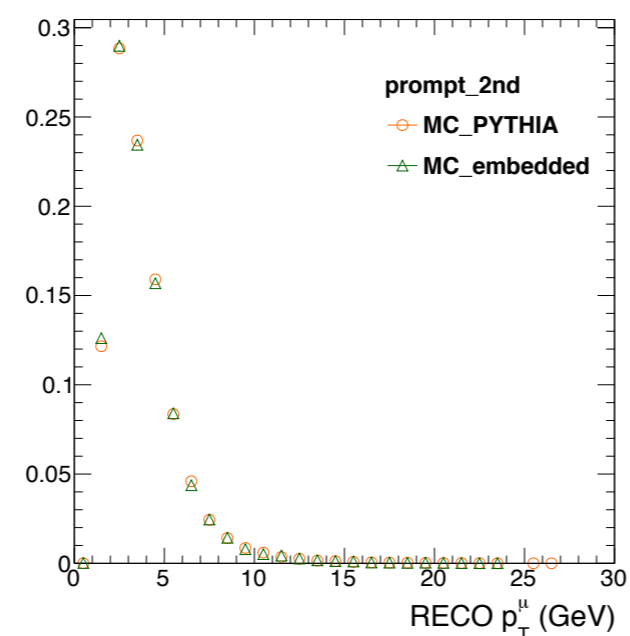
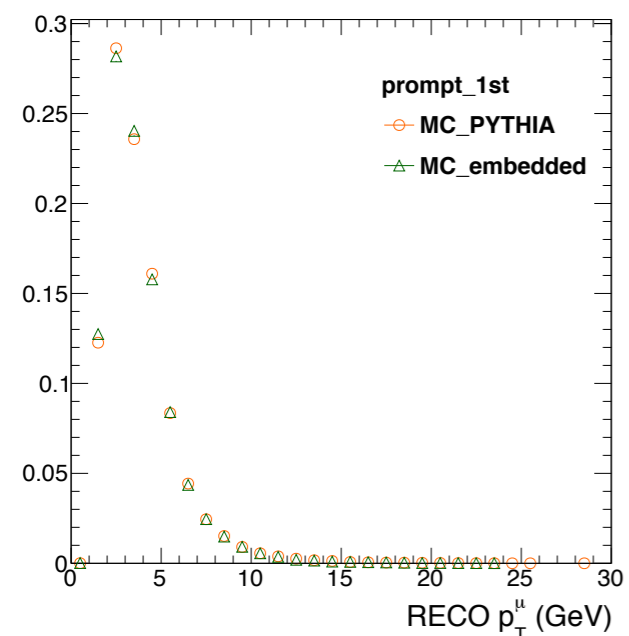


■ pythia / embedded







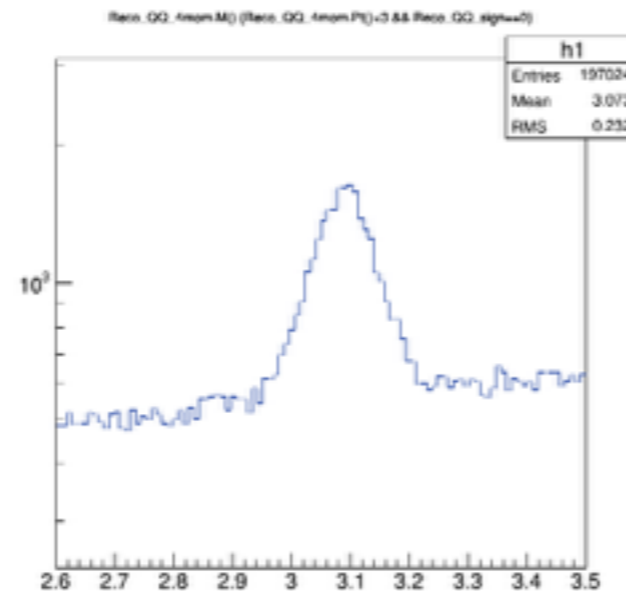




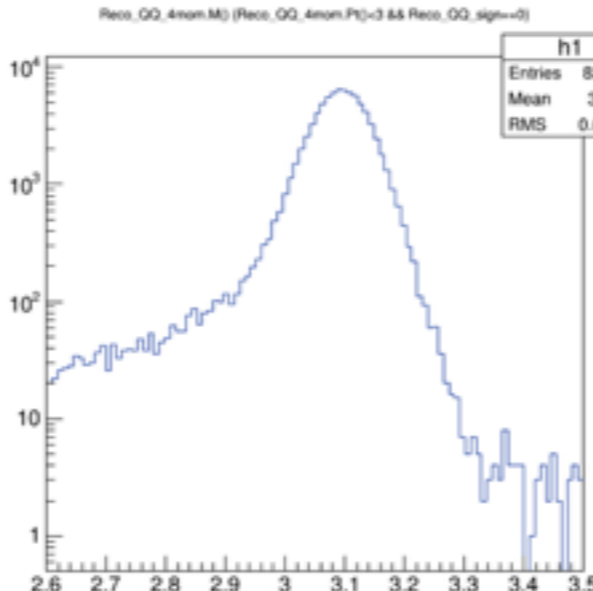
pythia vs embedded

- Efficiency values

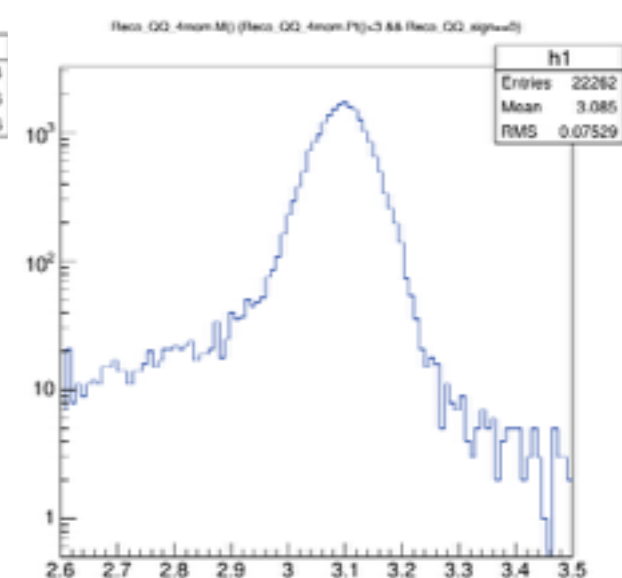
Data



pythia

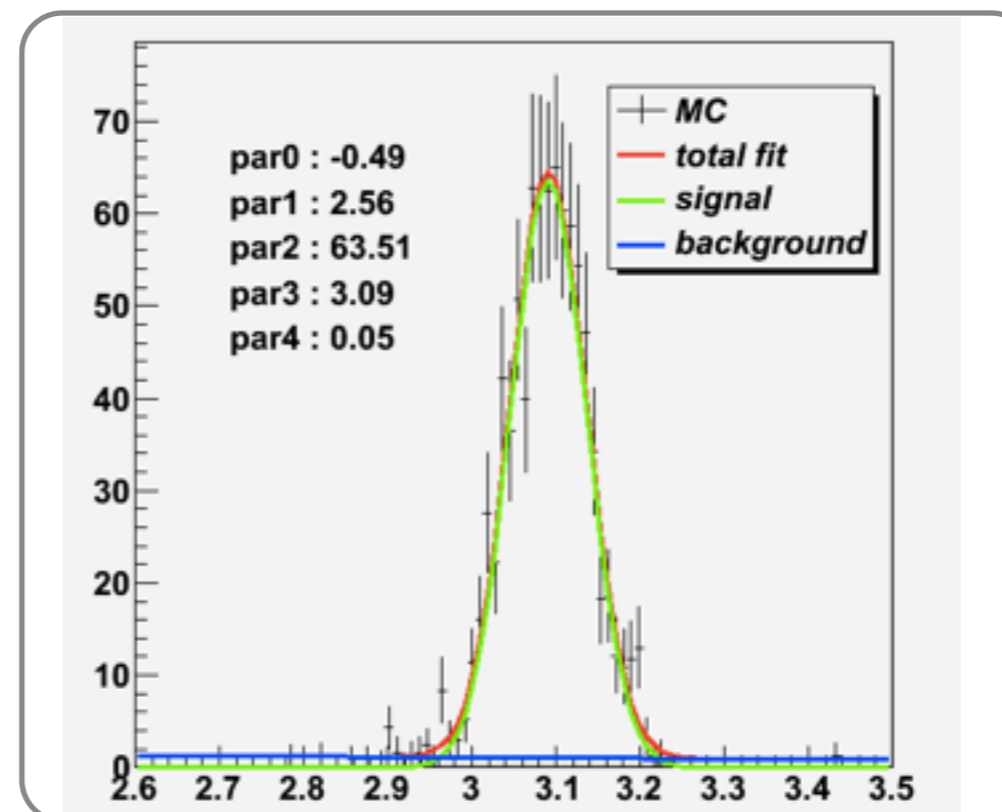


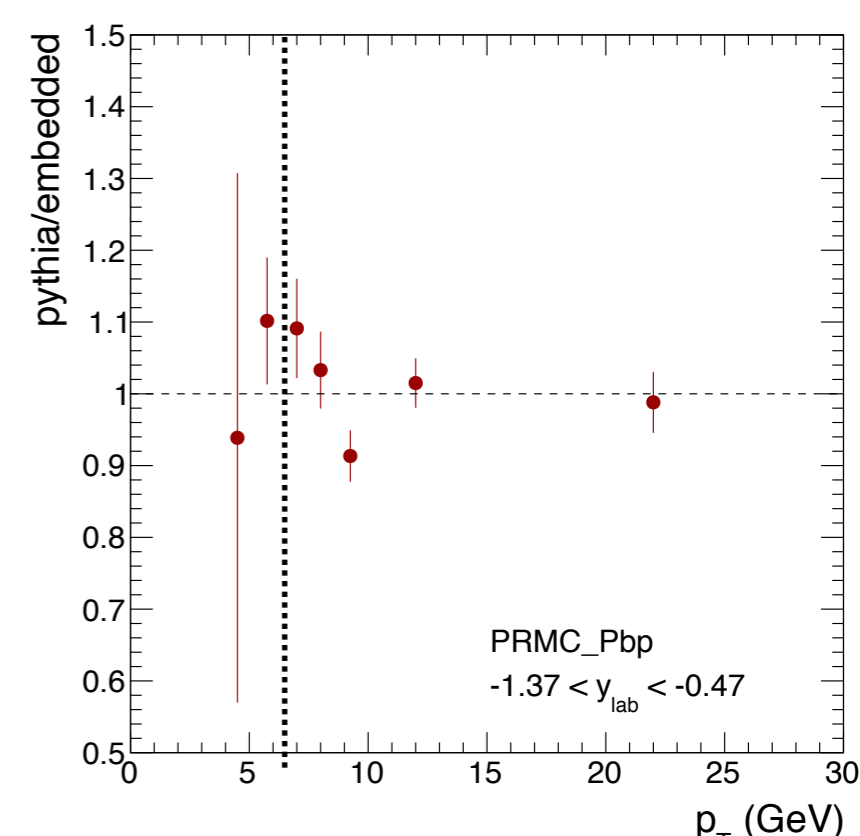
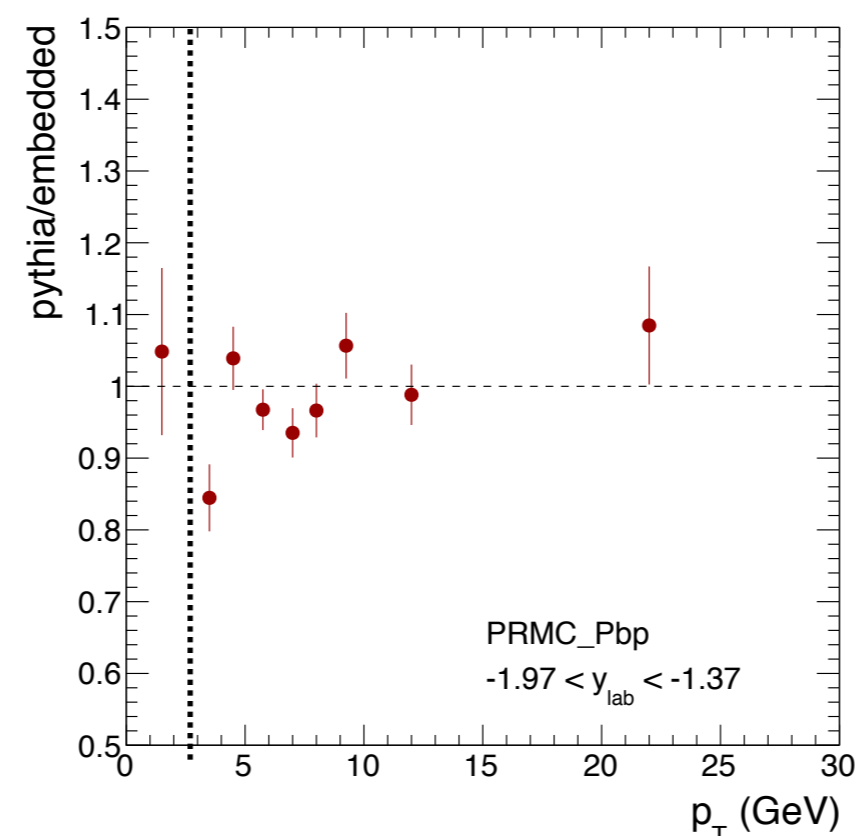
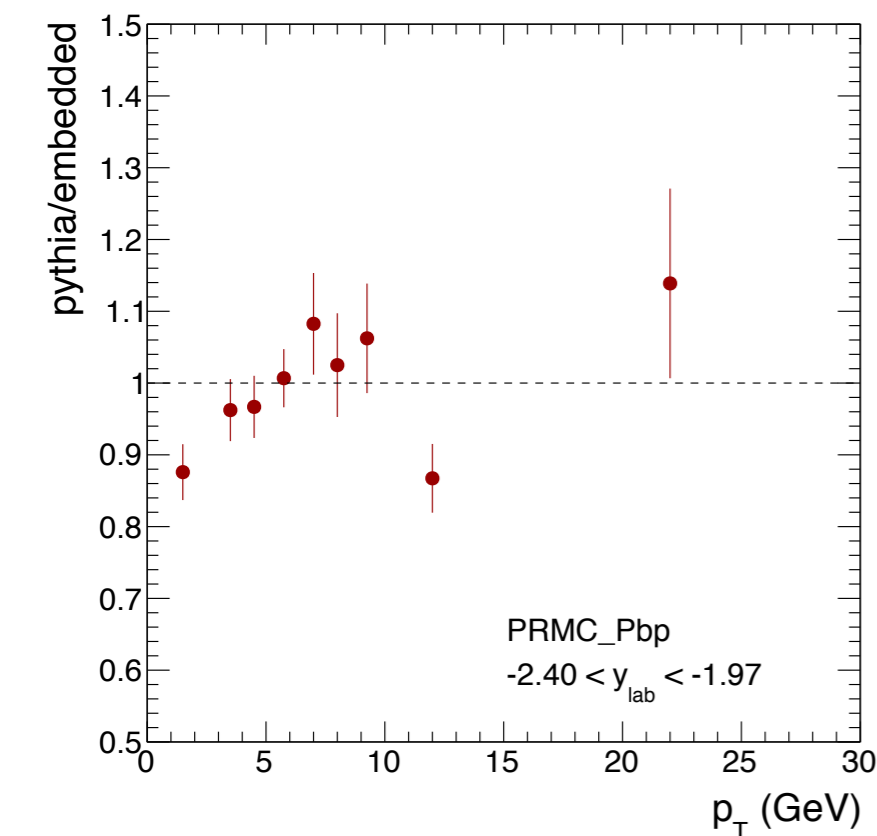
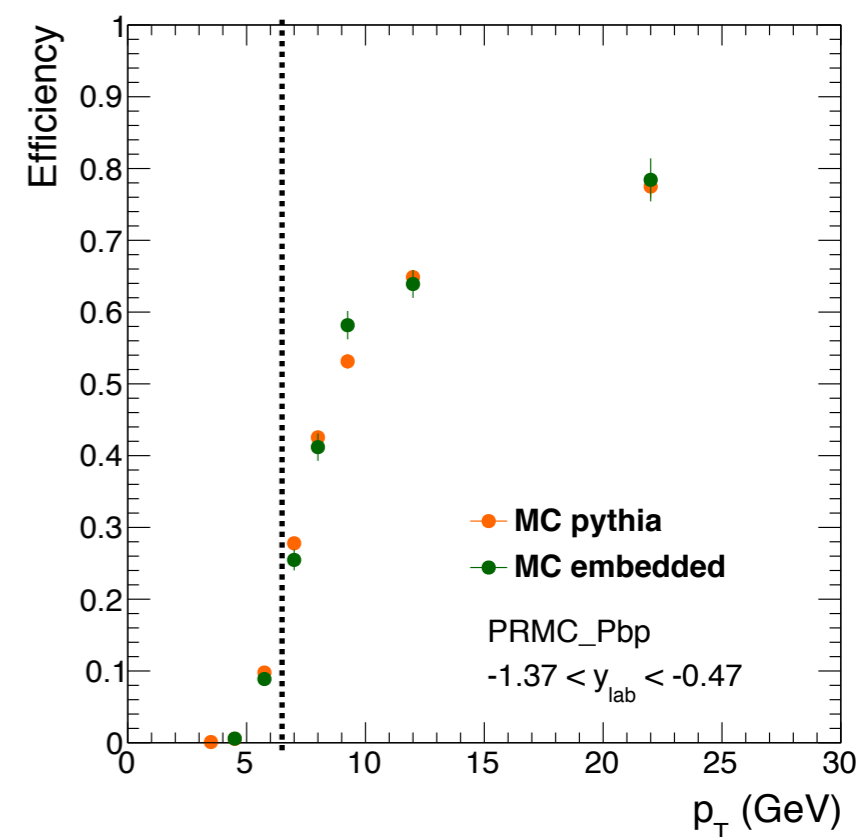
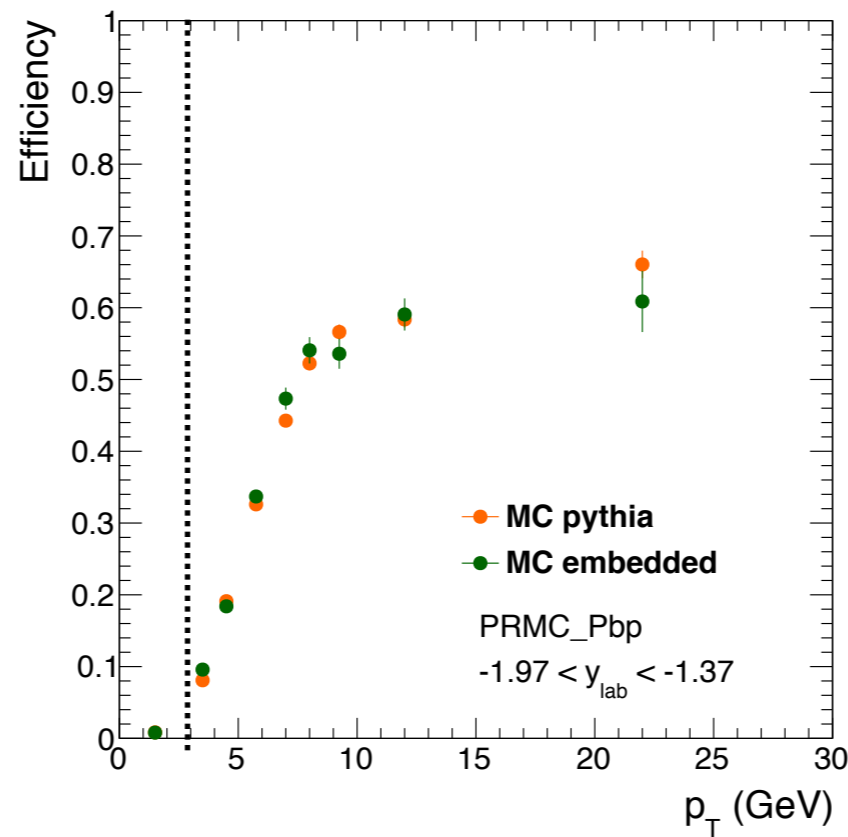
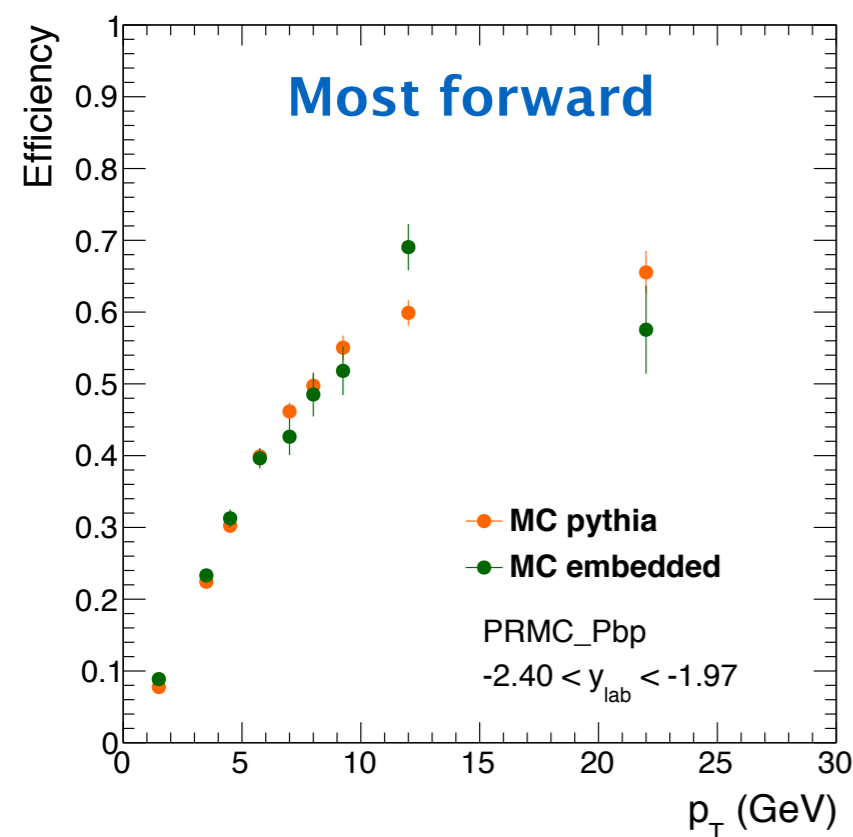
embedded

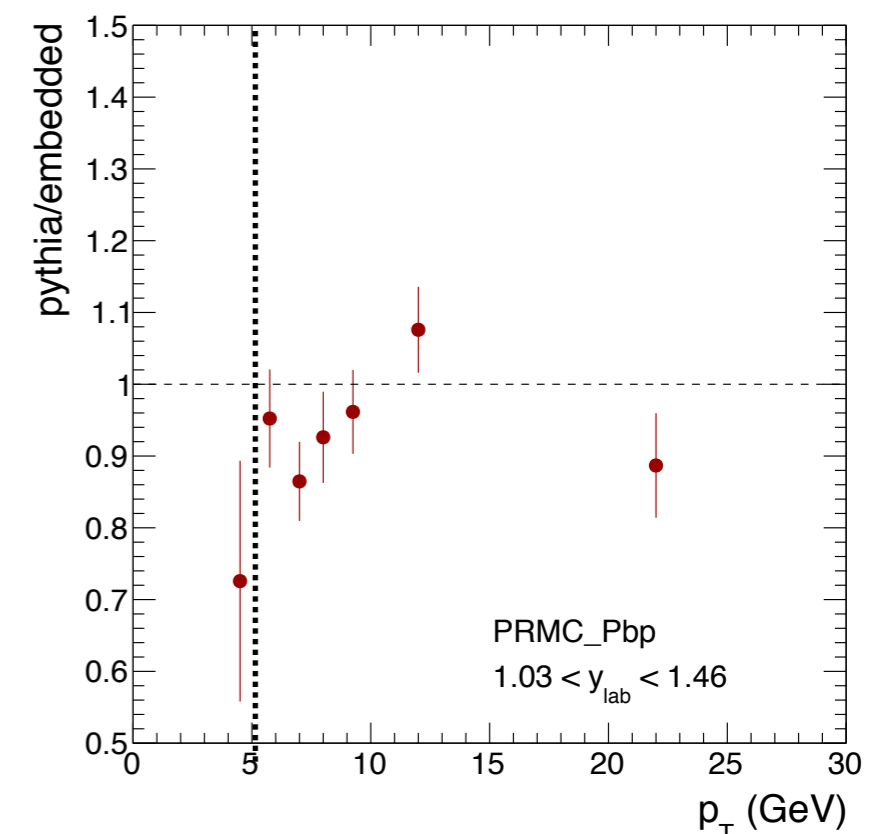
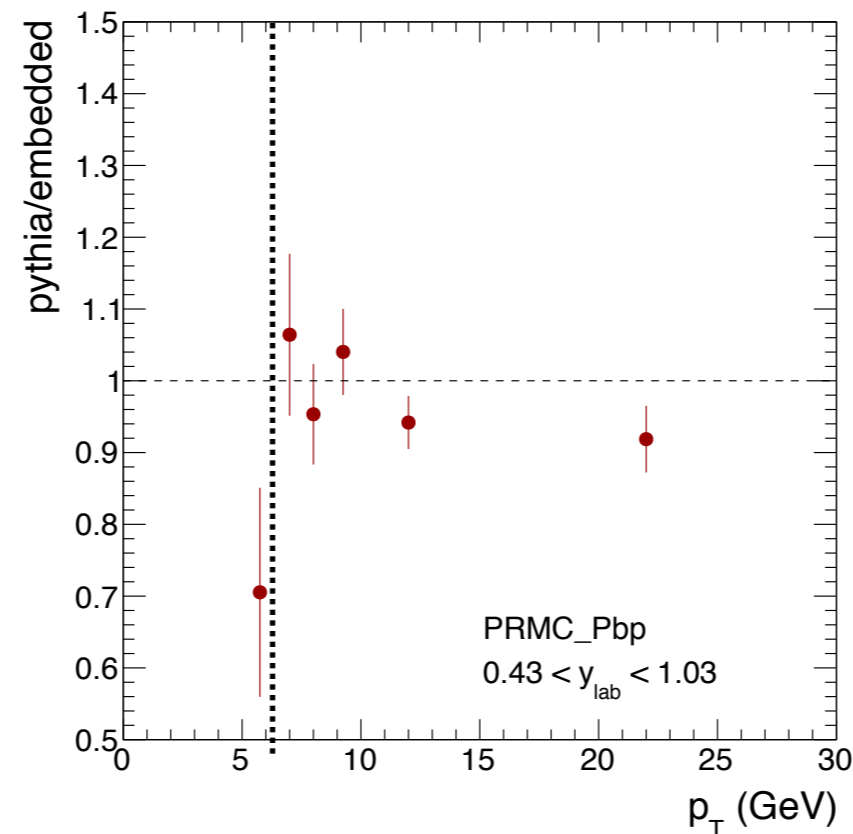
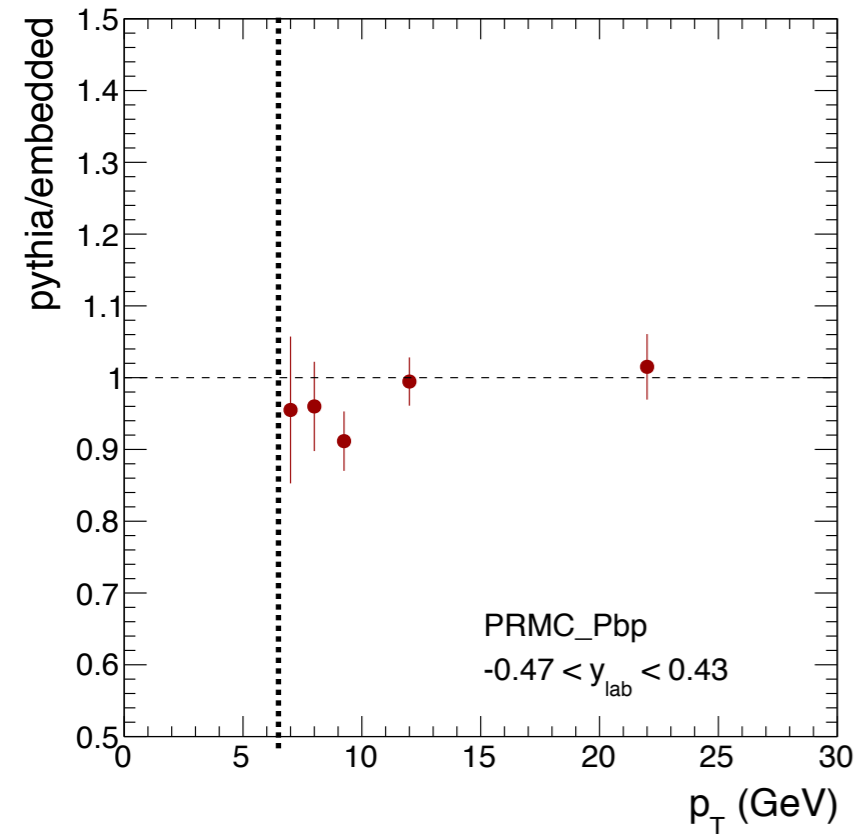
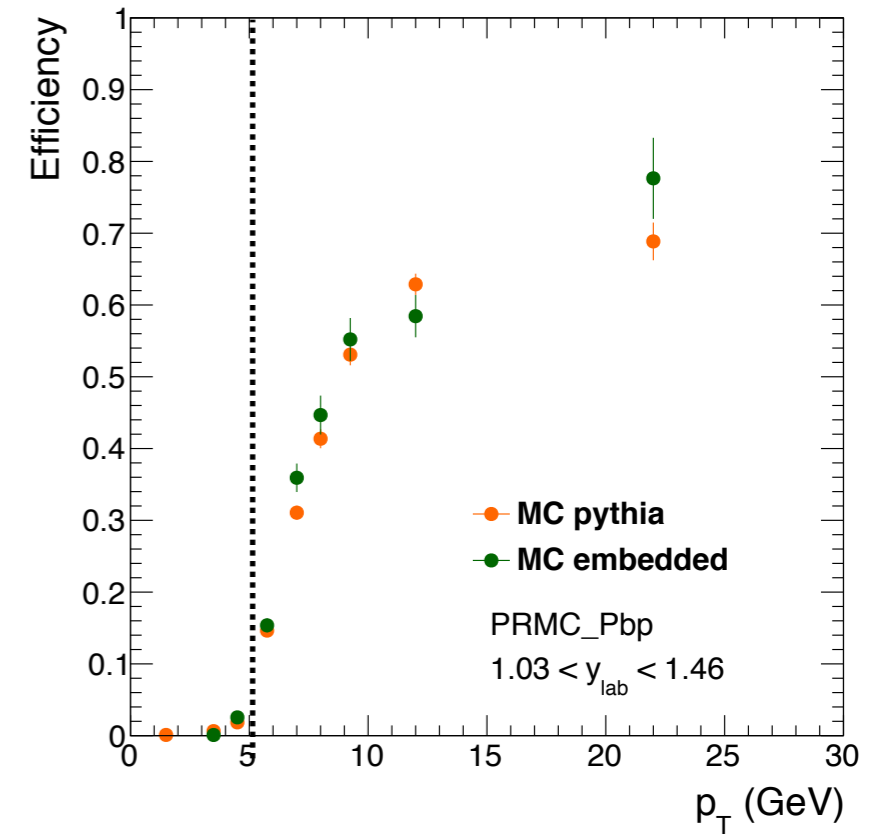
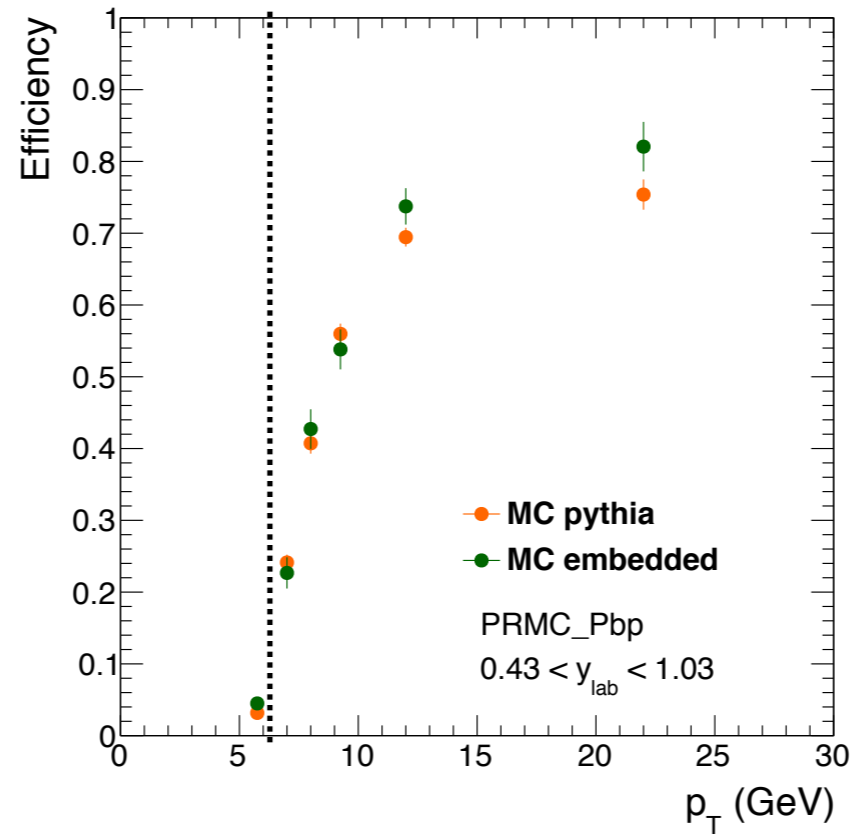
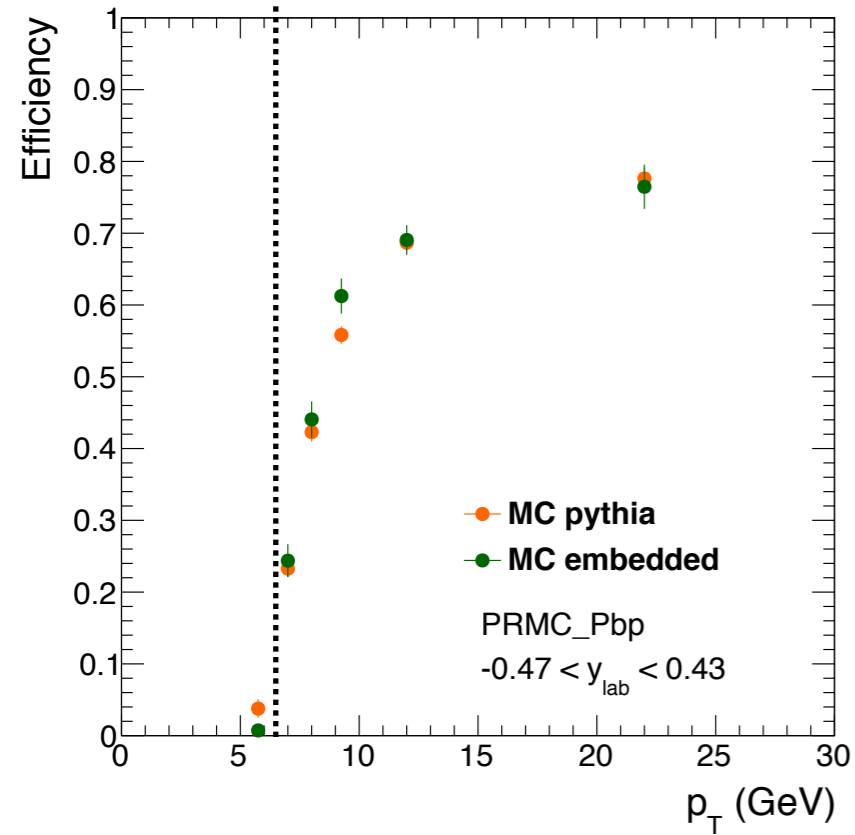


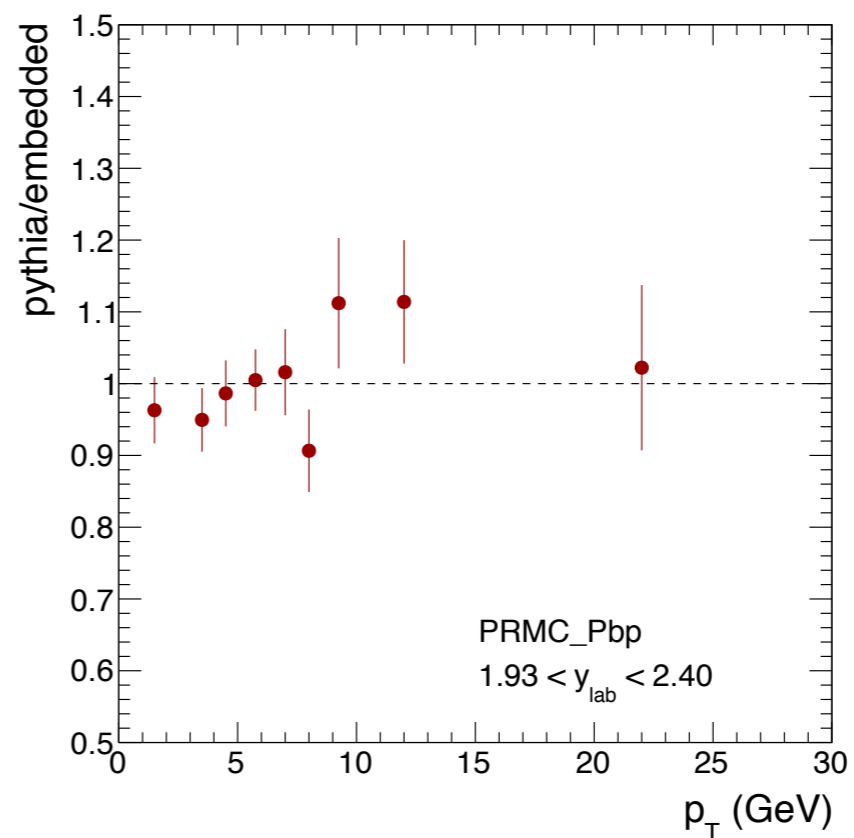
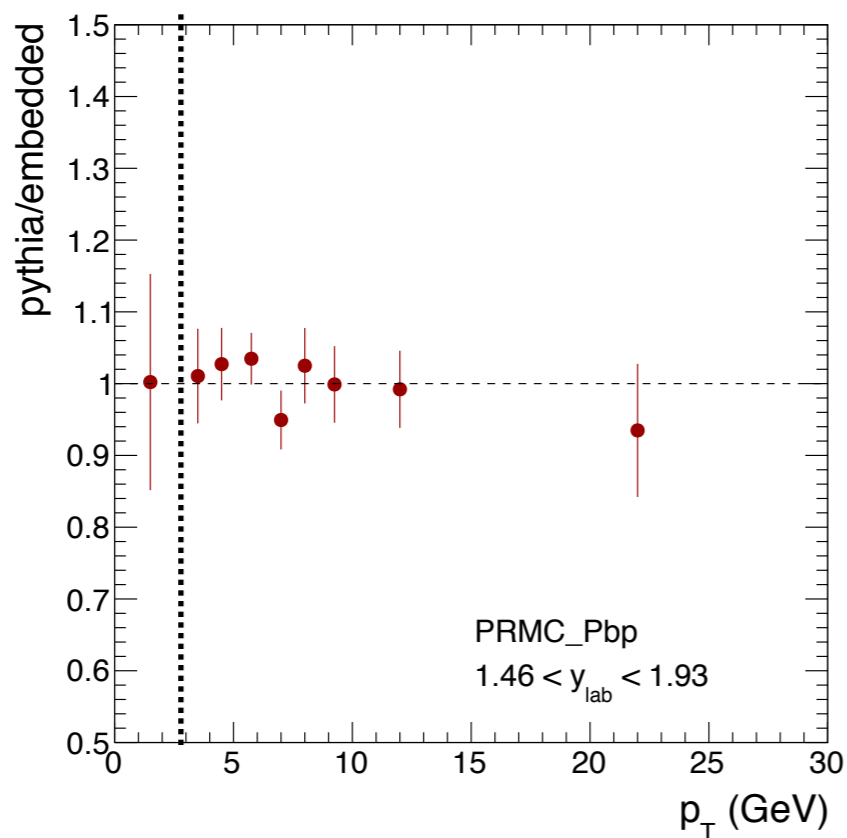
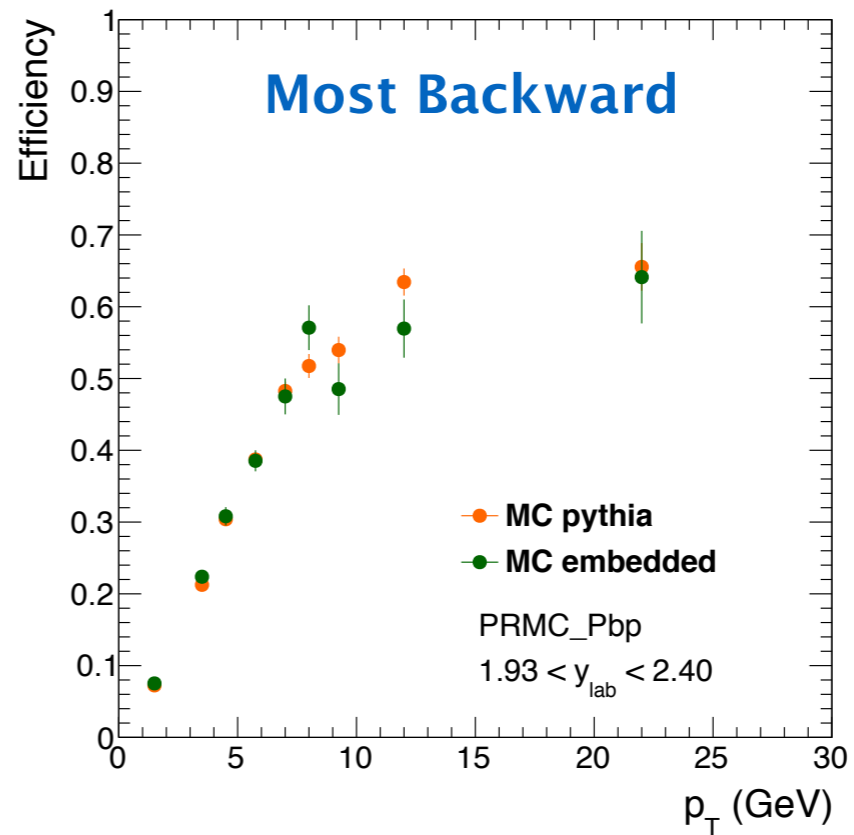
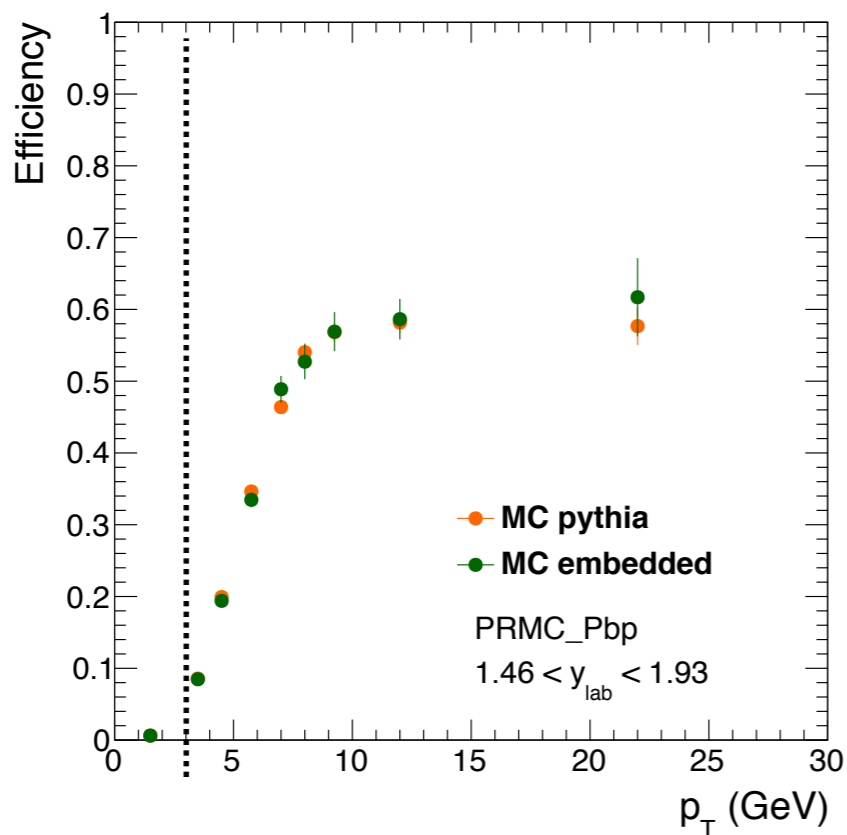
- e.g.) p_T 0–3 GeV/c bin
- Even in the lowest p_T bin, backgrounds in embedded sample are similar with those in pythia than those in actual data.

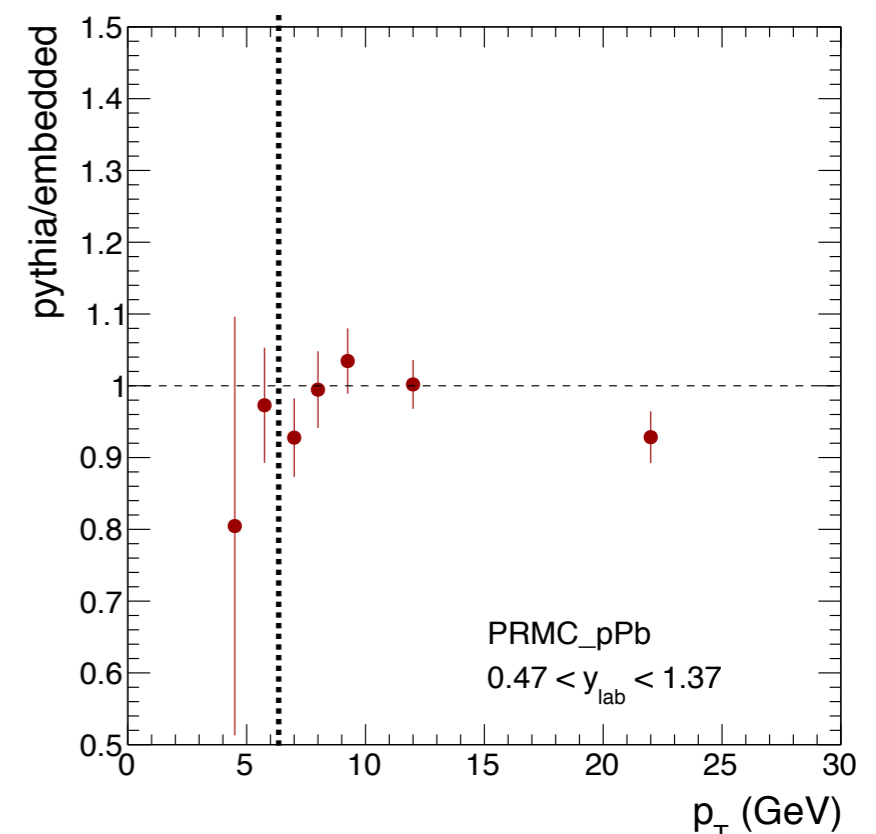
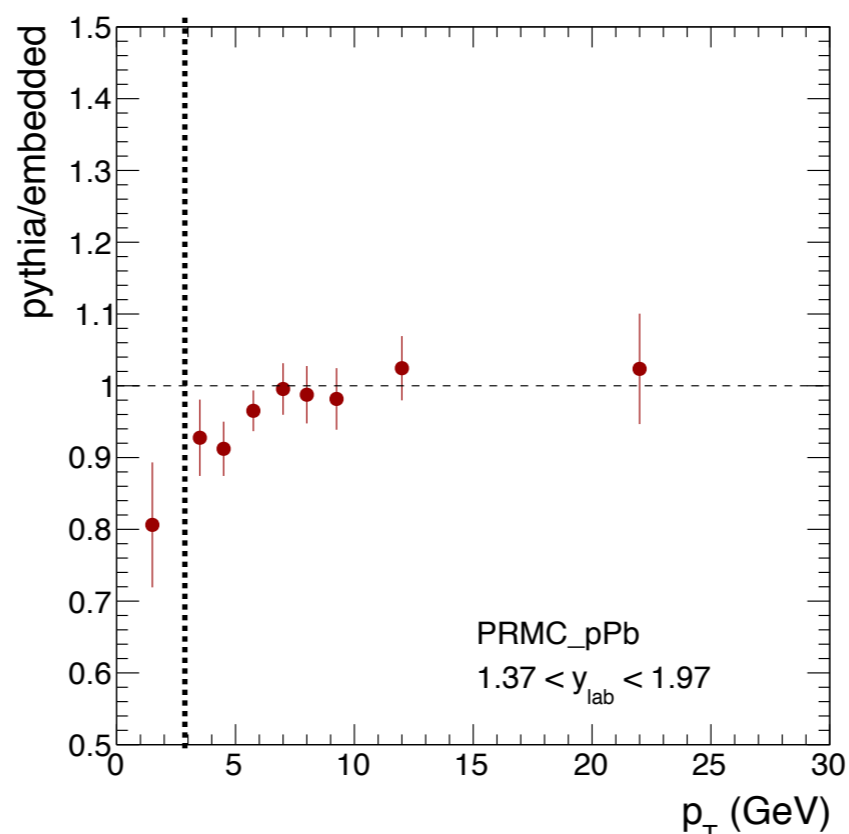
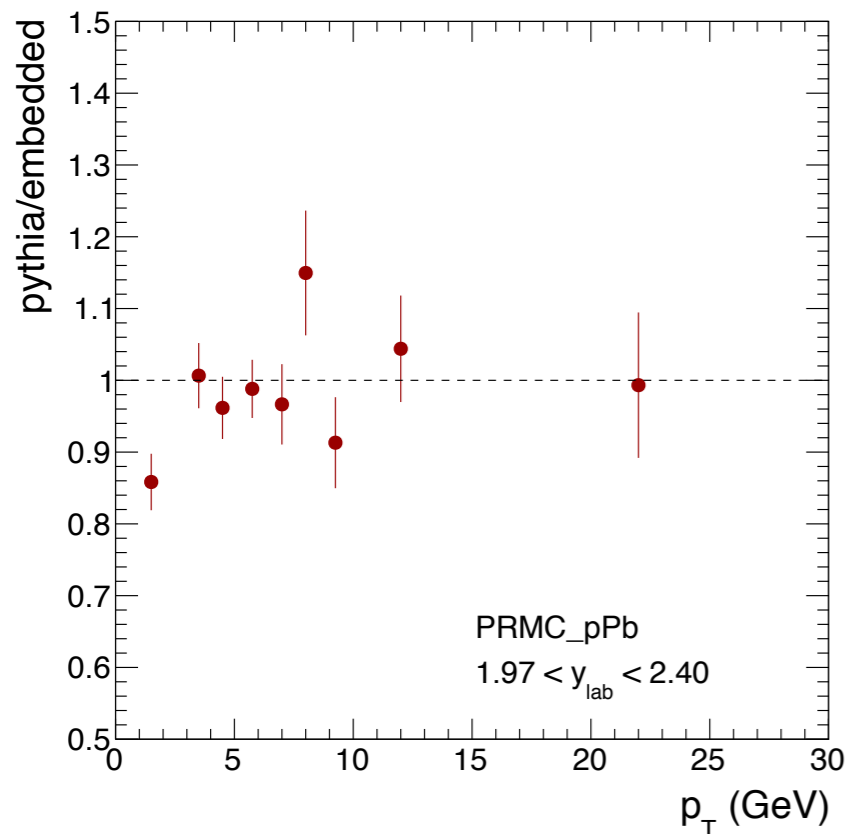
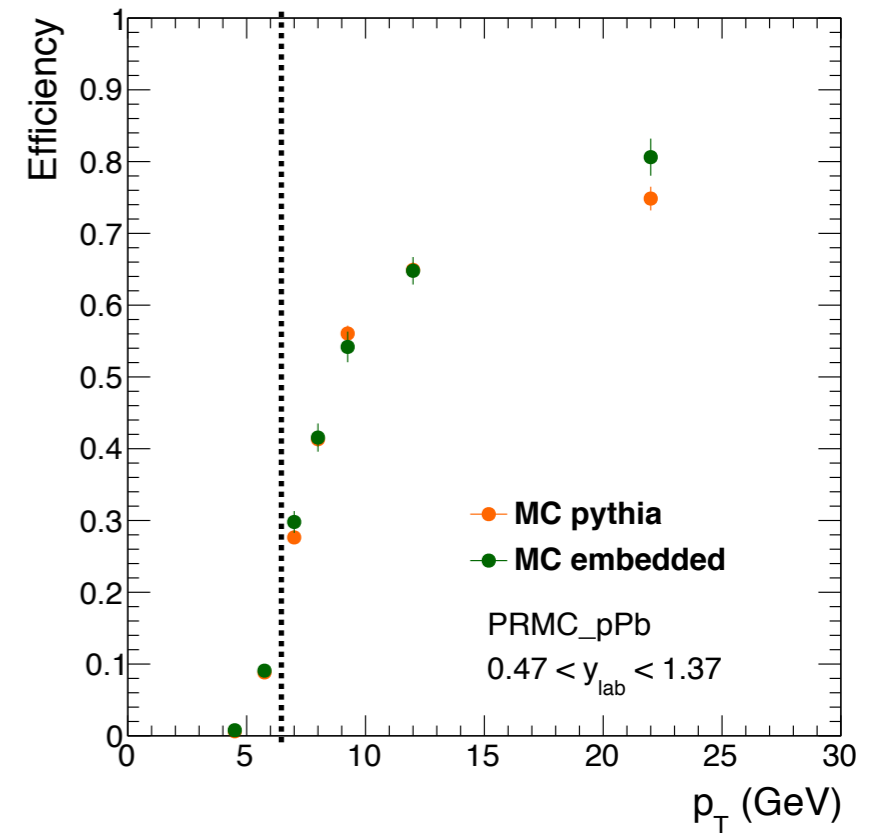
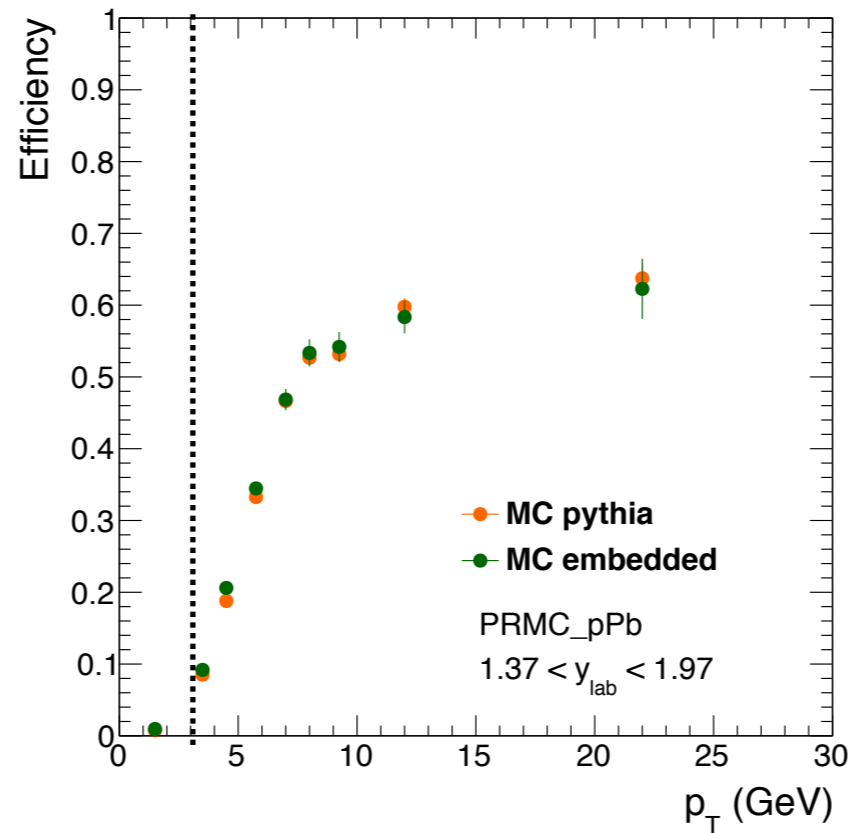
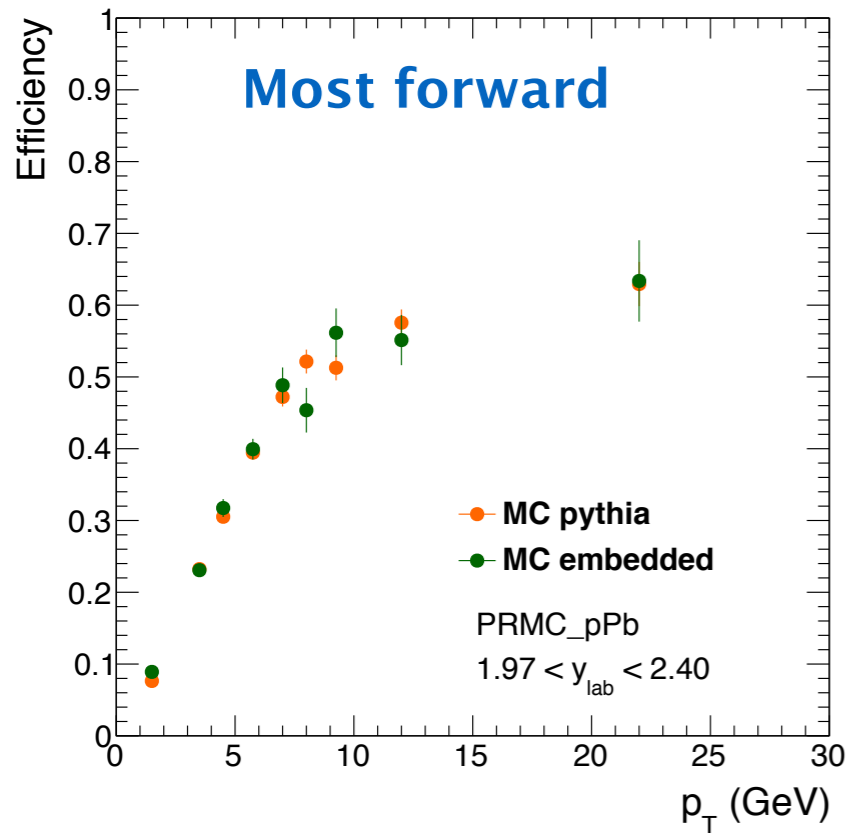
- signal – gaussian
- background – 1st order polynomial
- Almost no background
→ We can use counting method ?

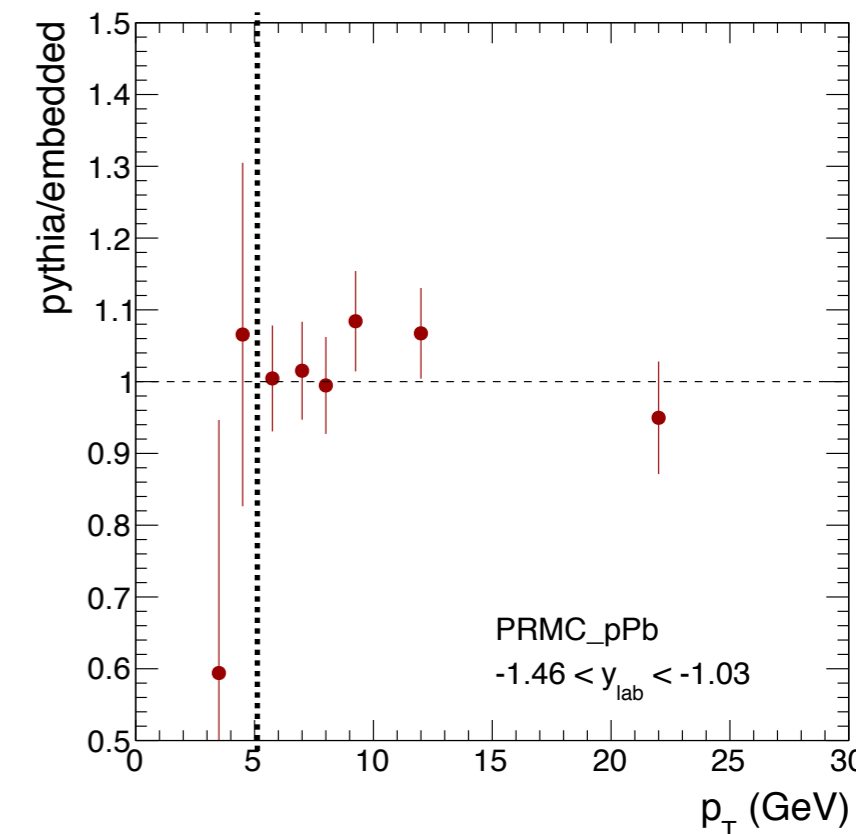
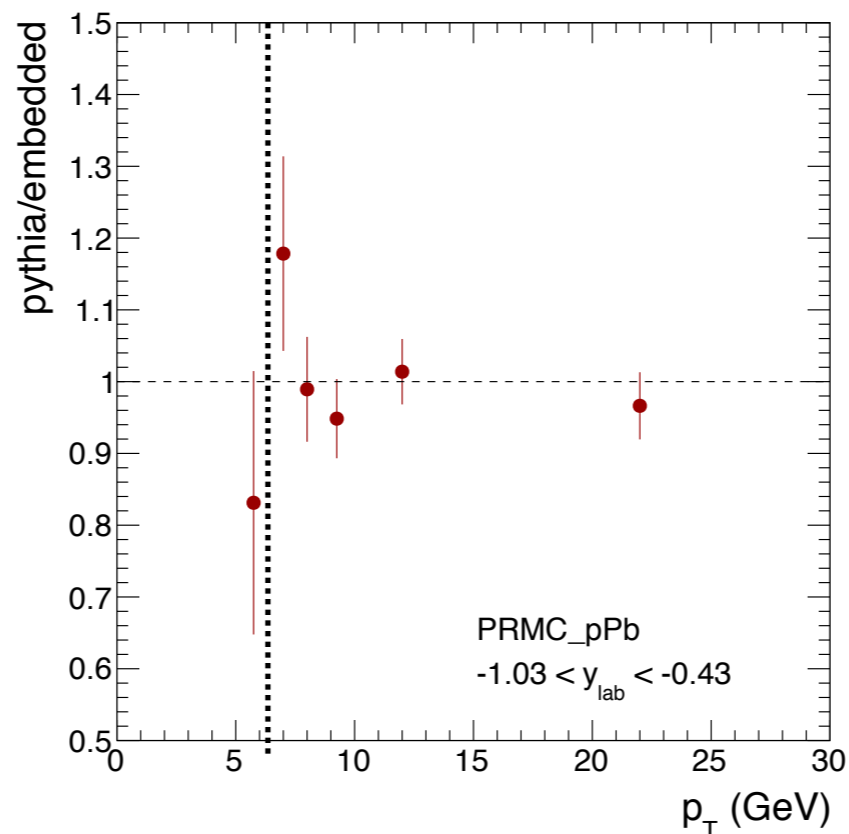
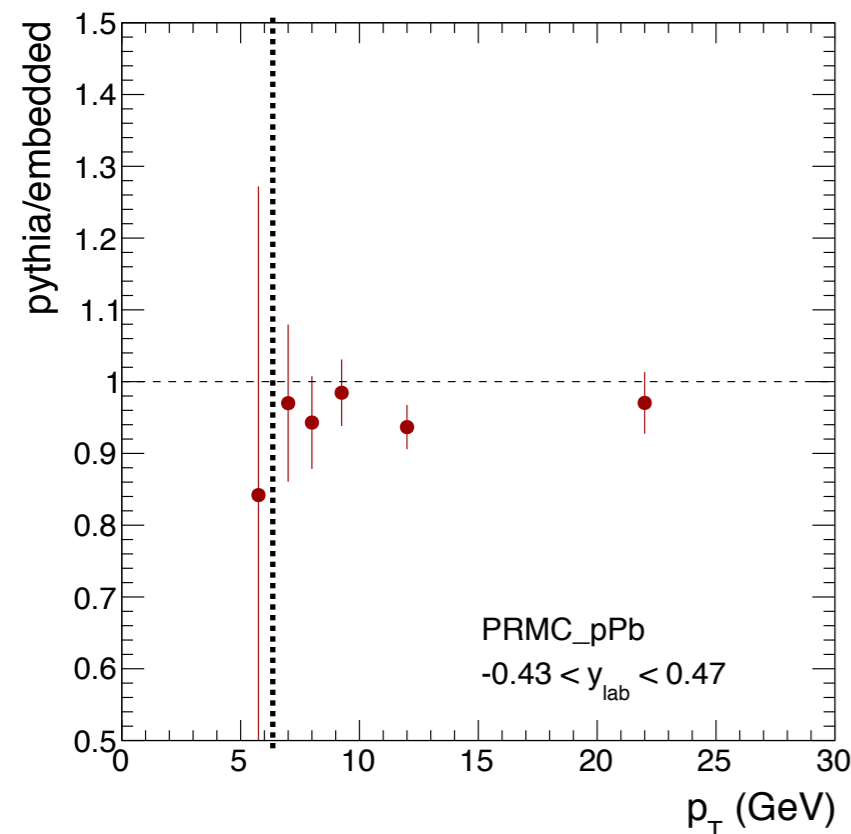
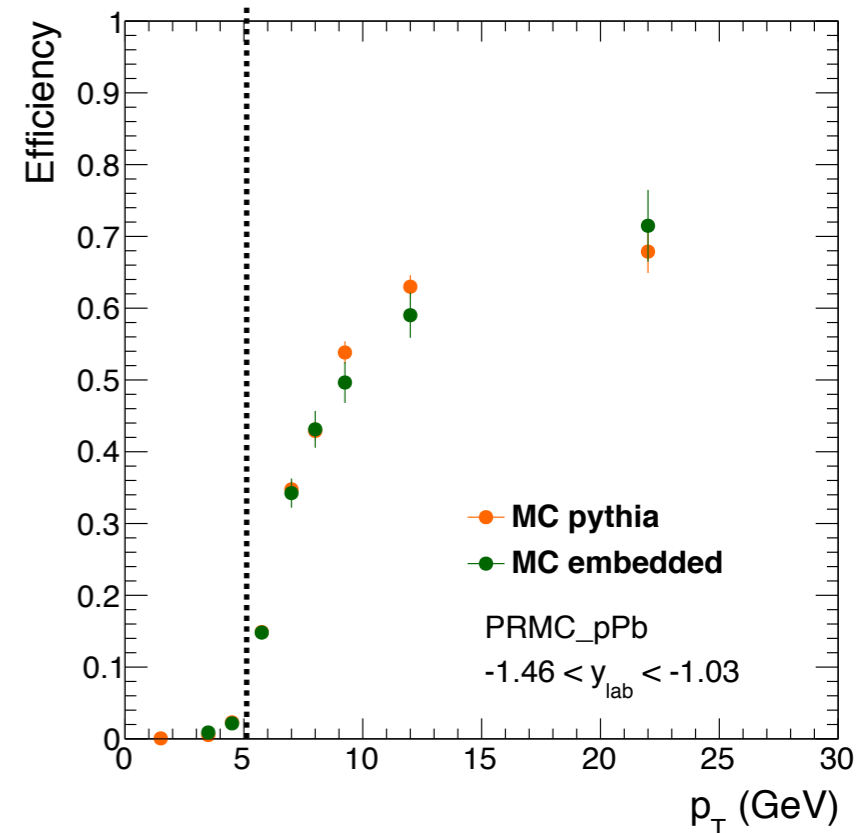
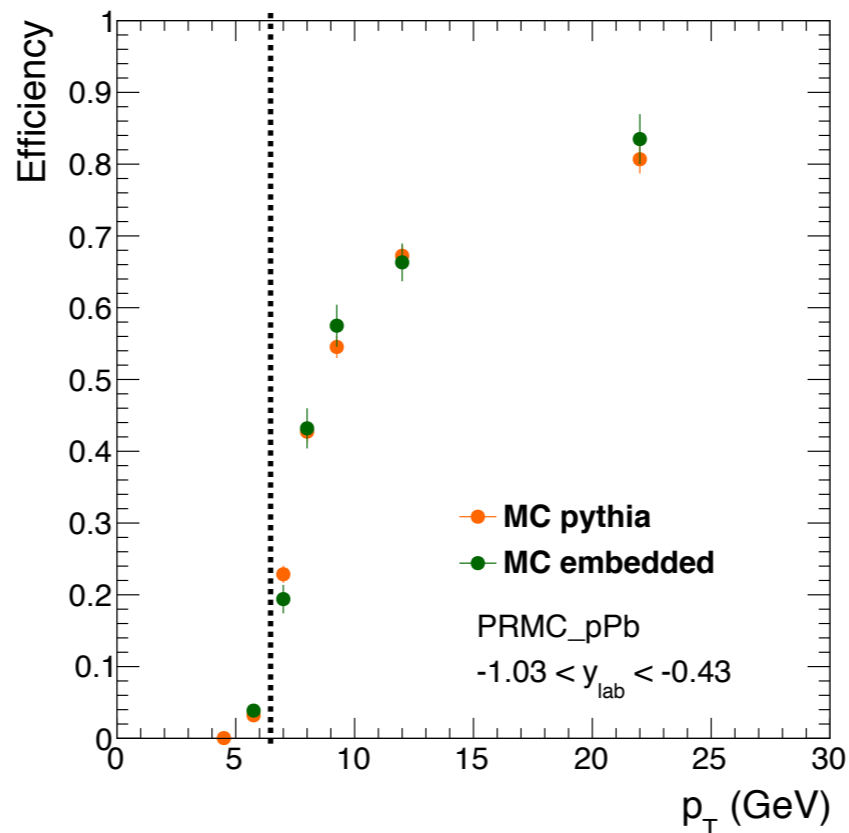
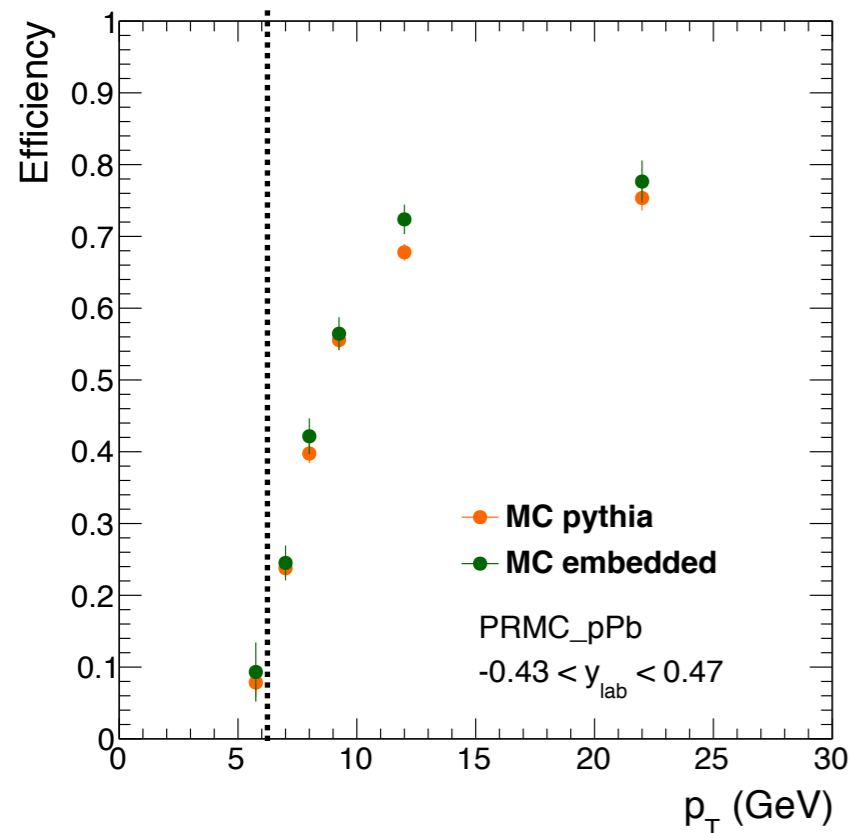


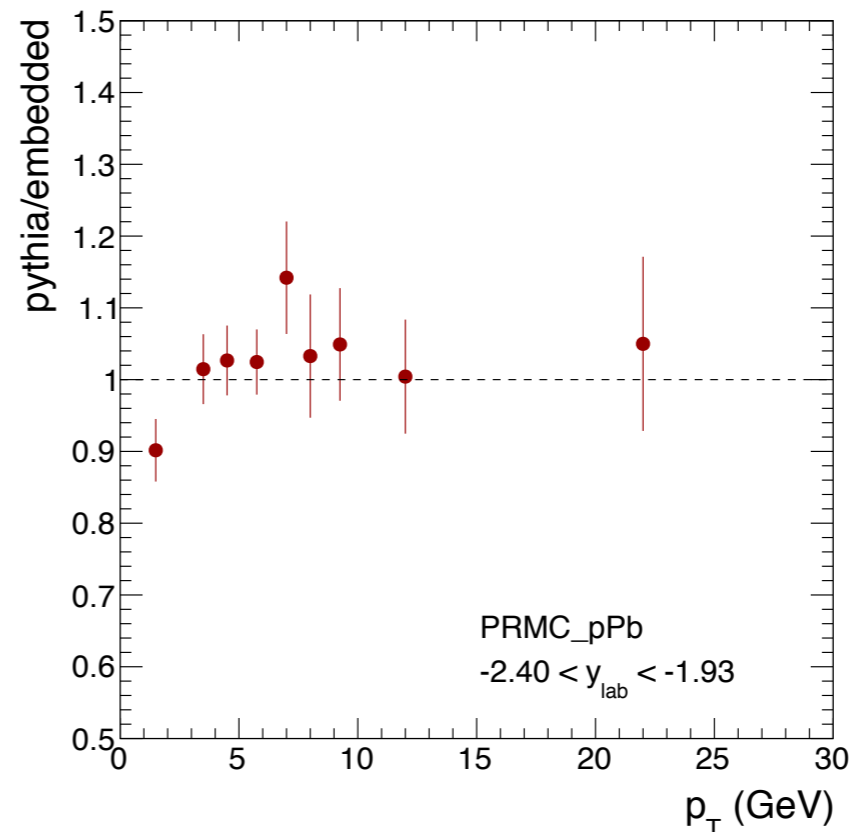
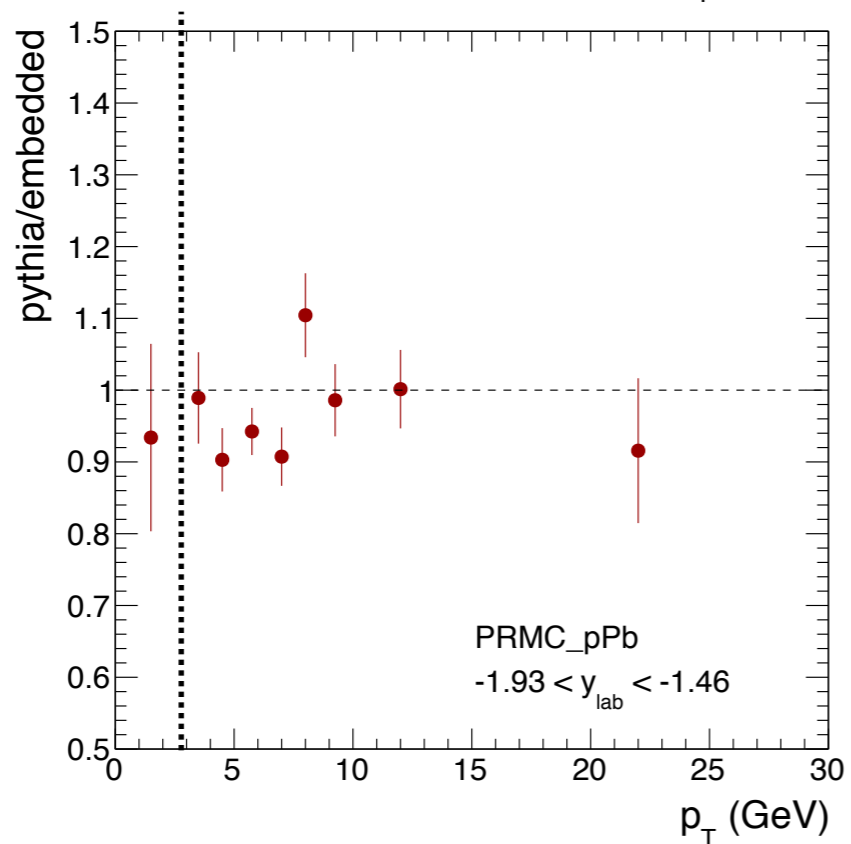
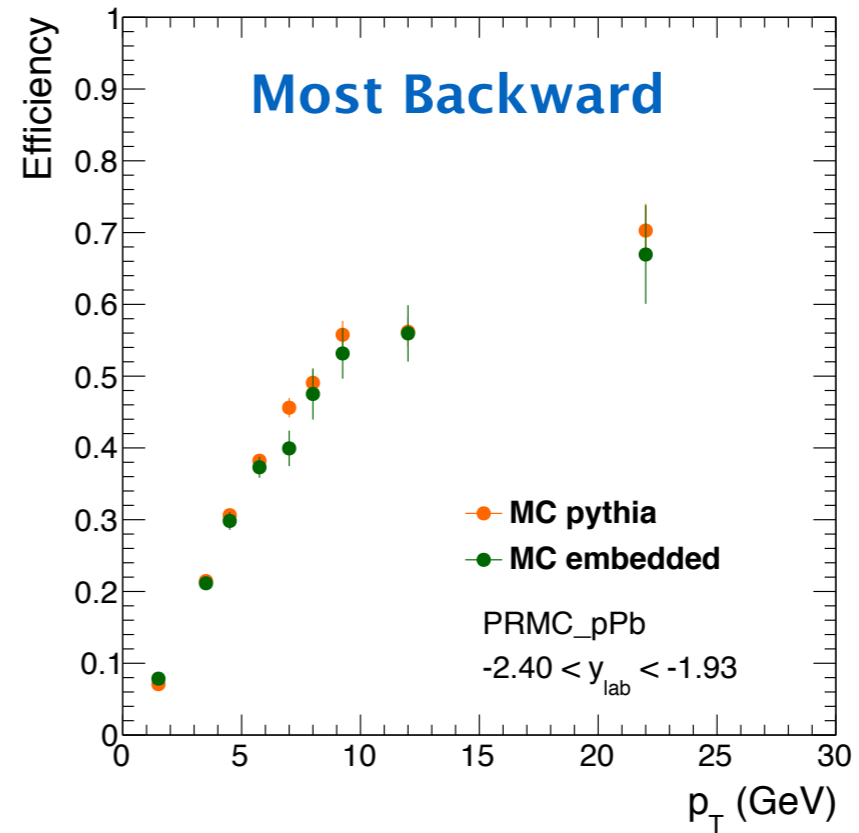
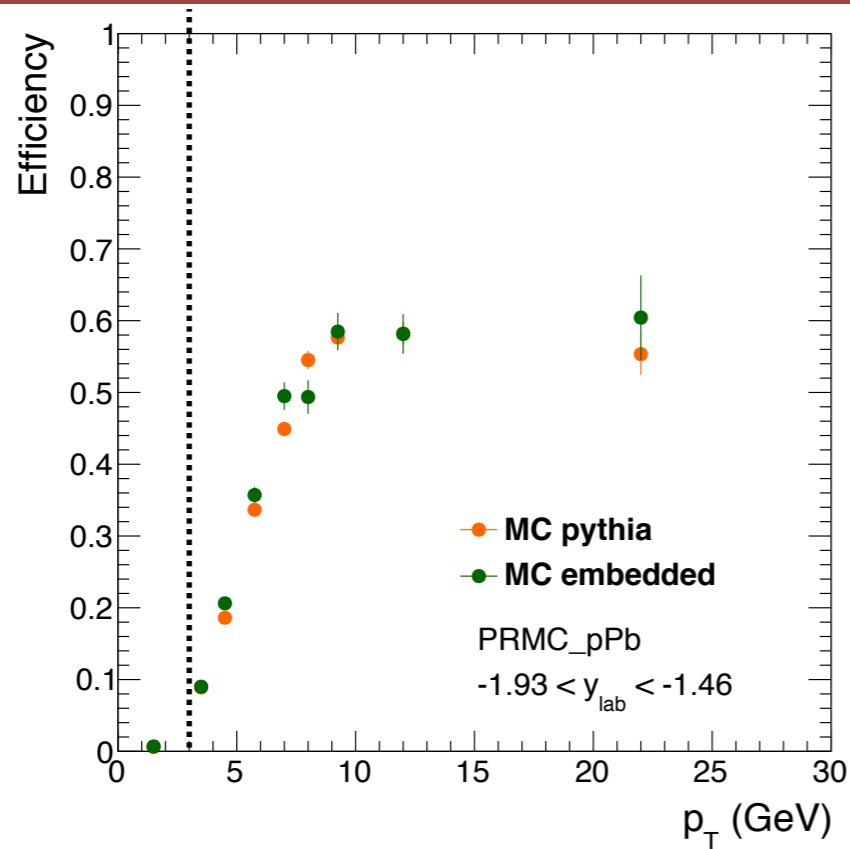


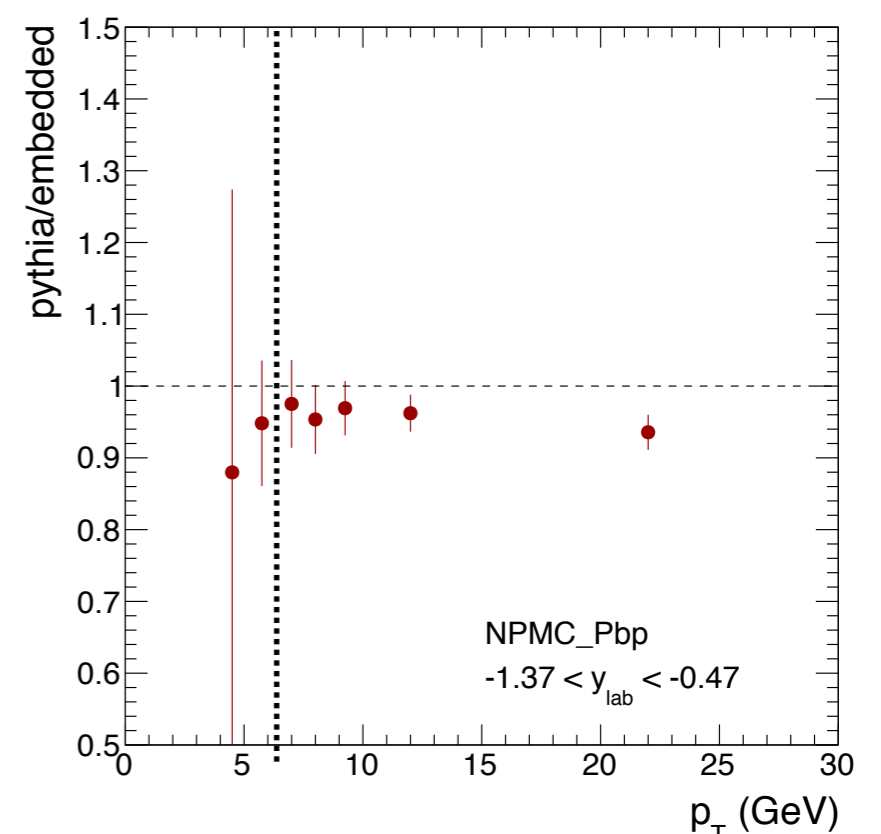
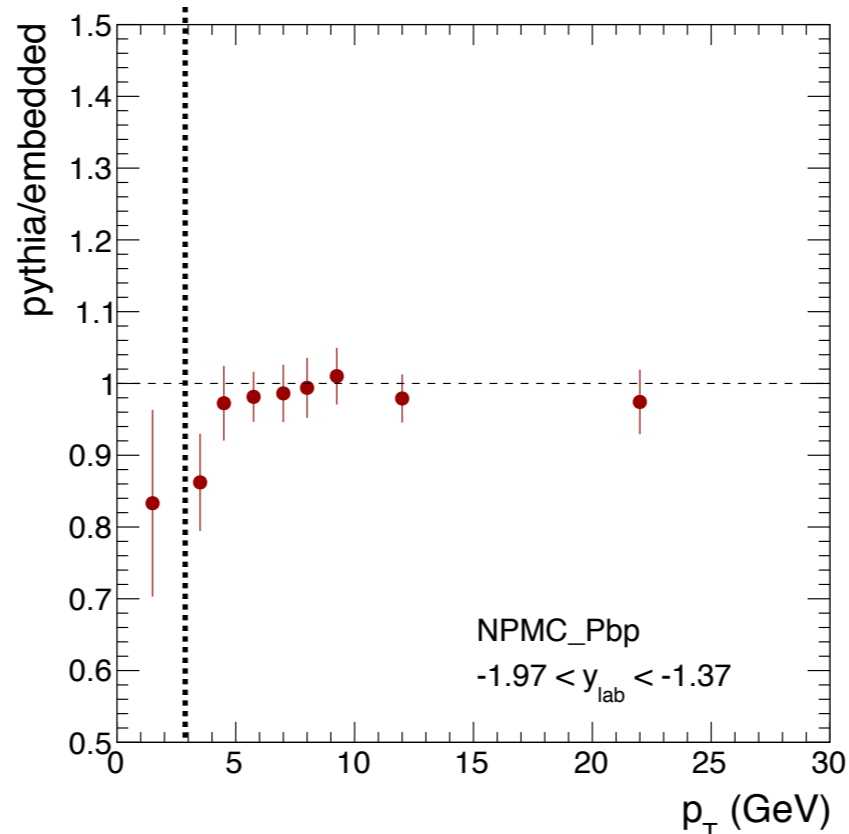
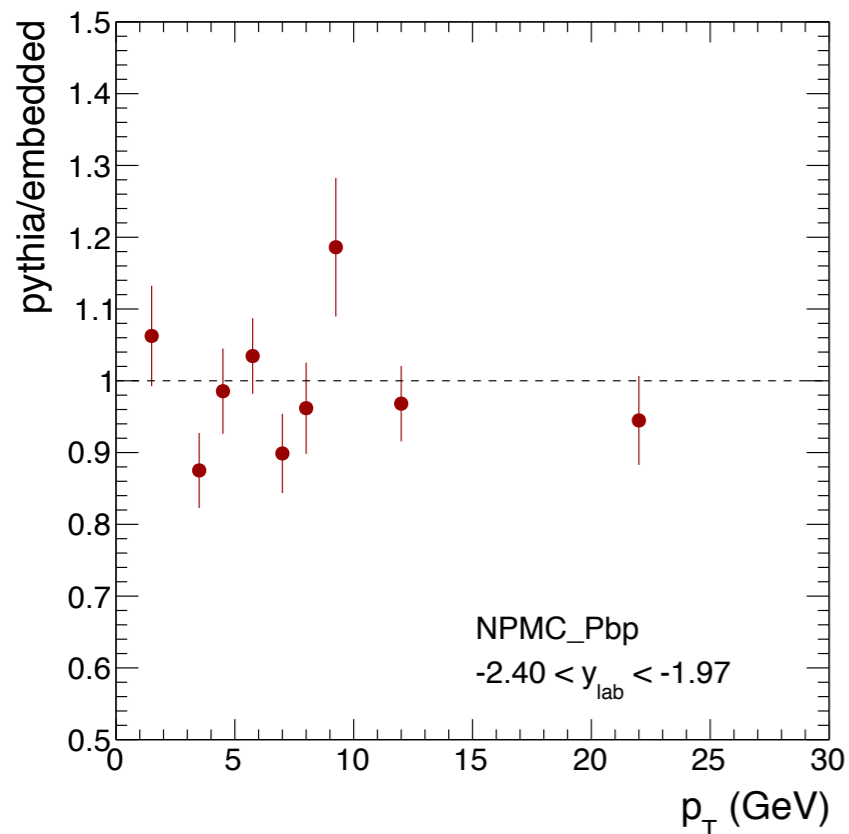
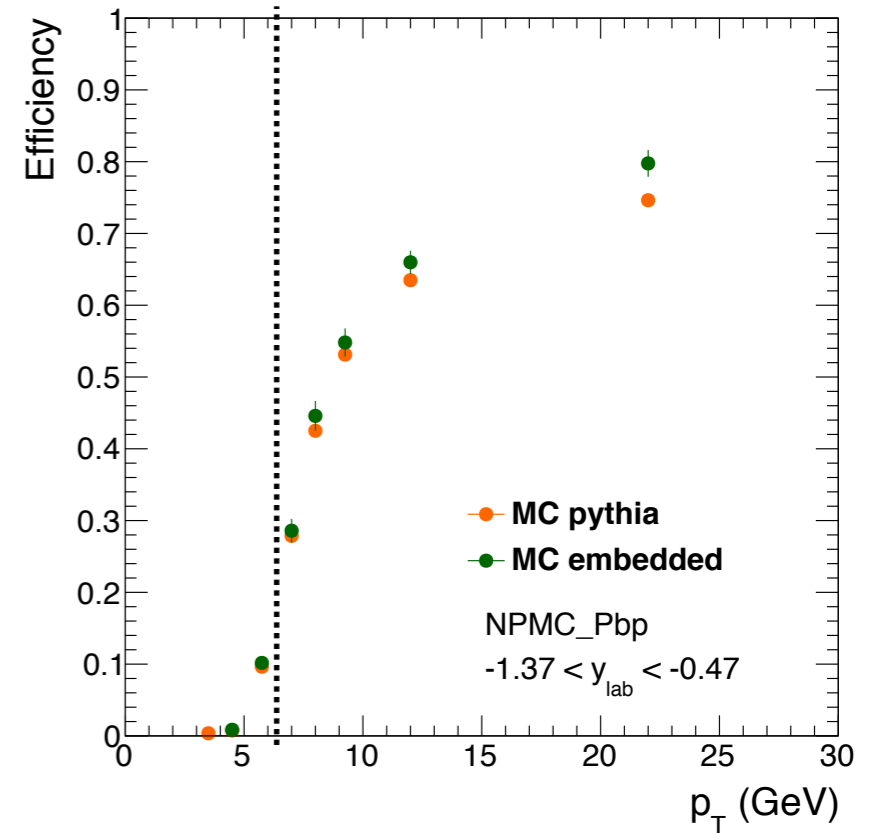
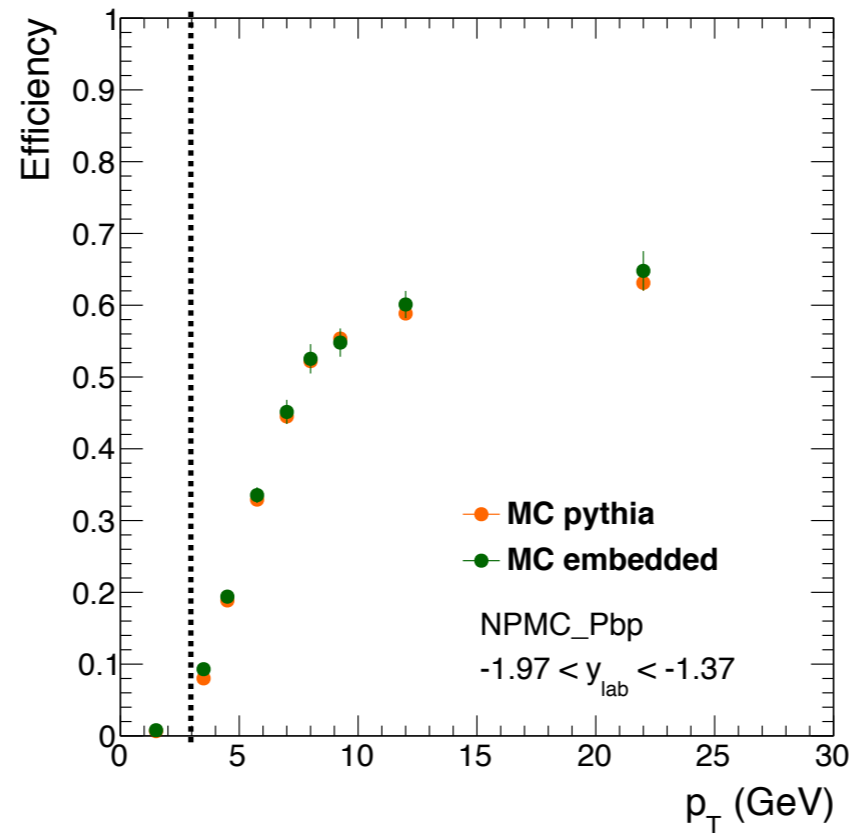
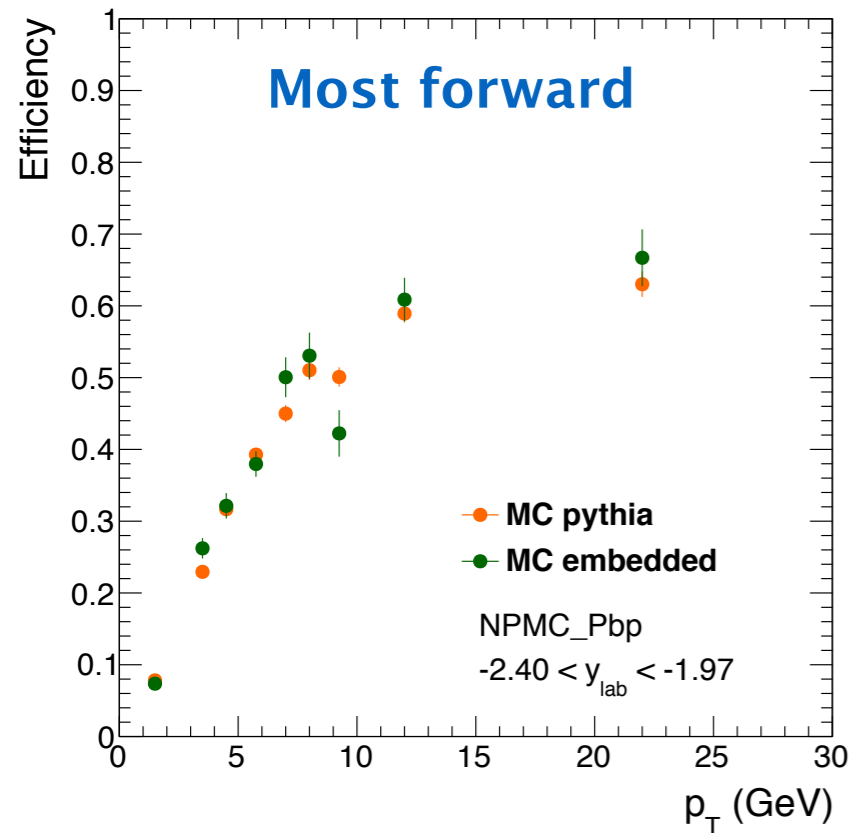


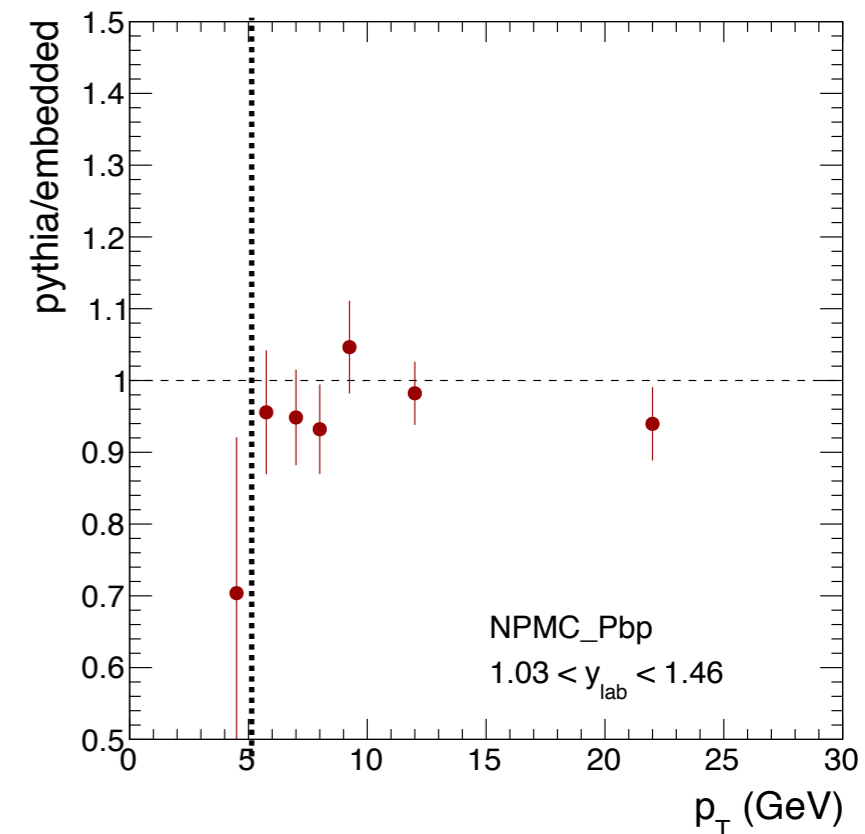
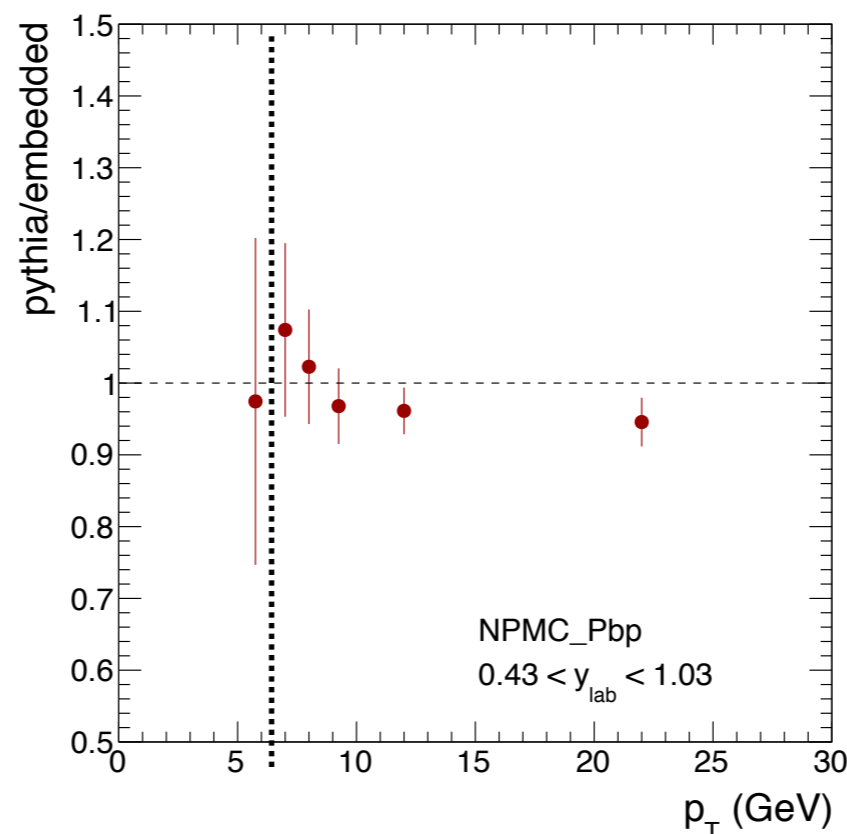
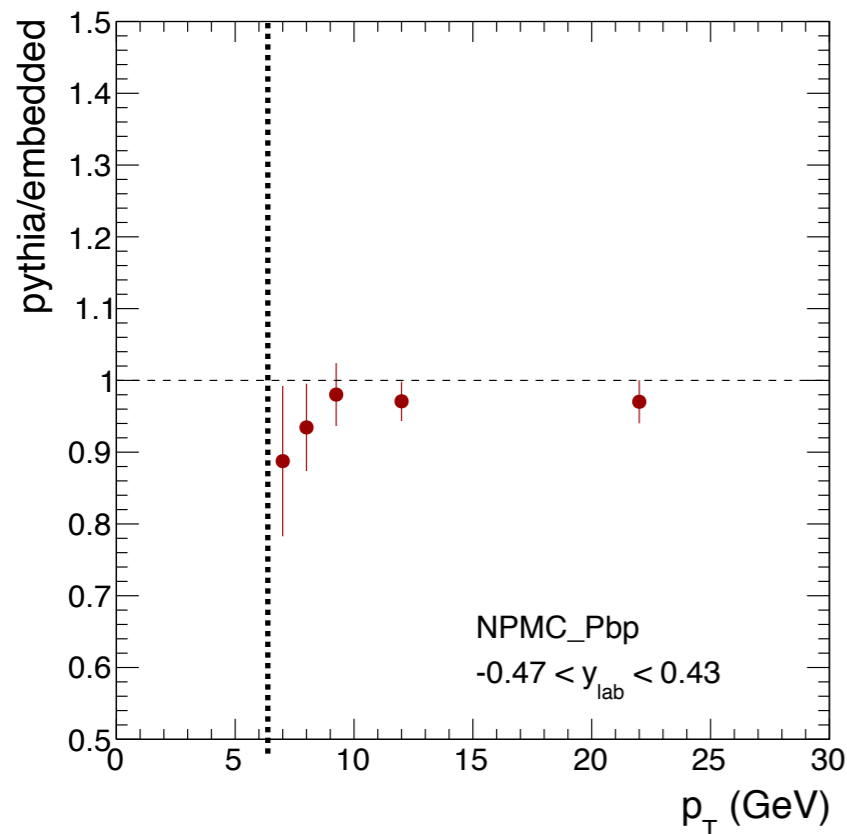
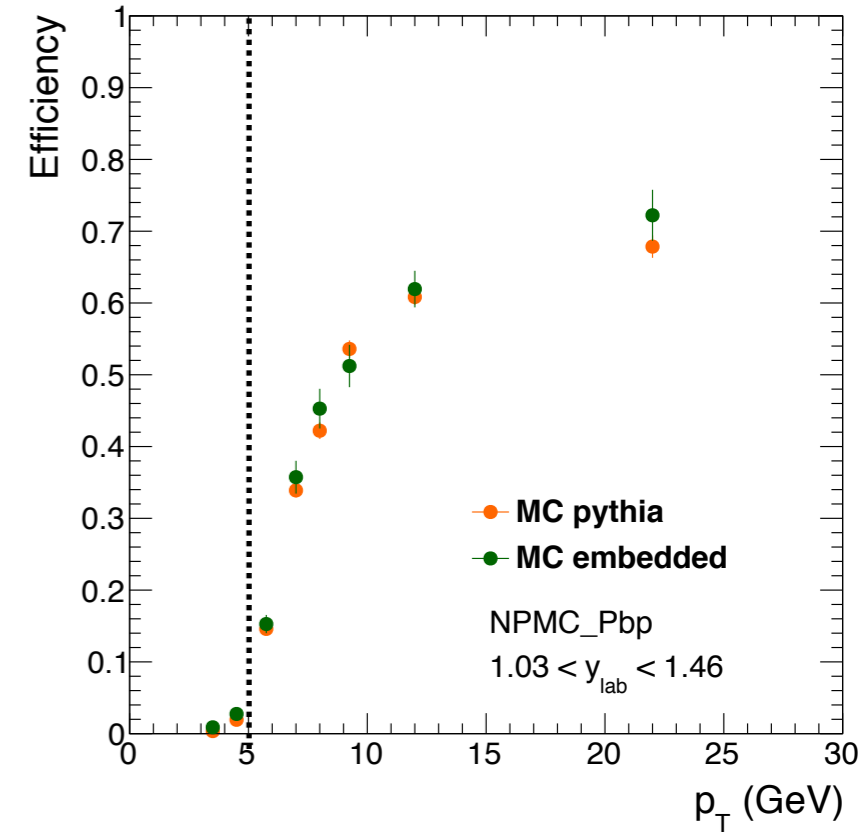
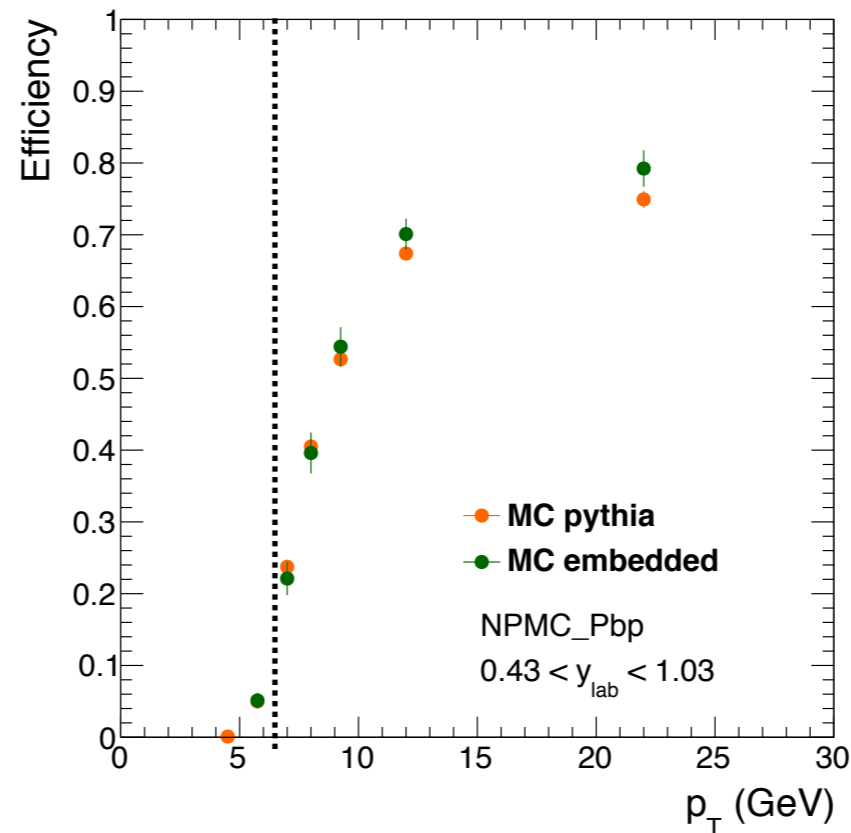
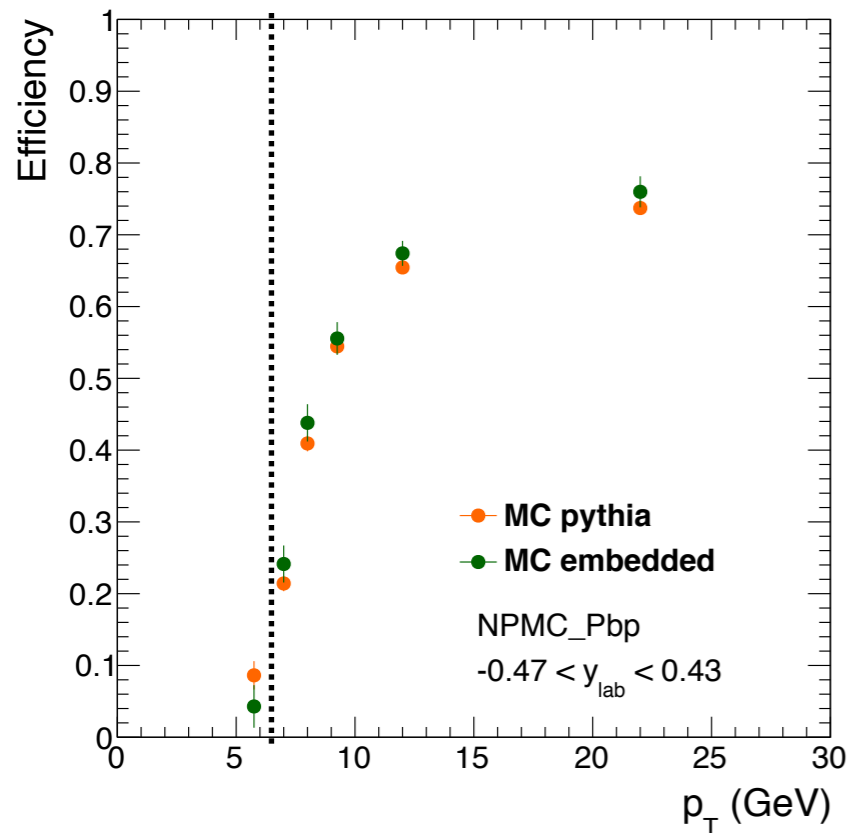




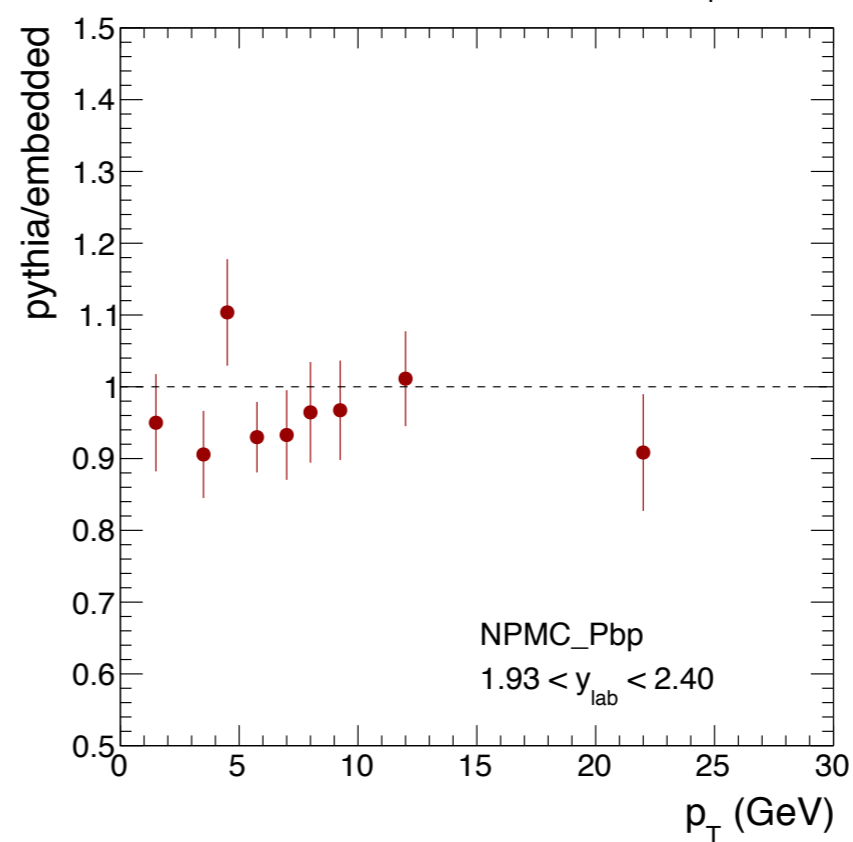
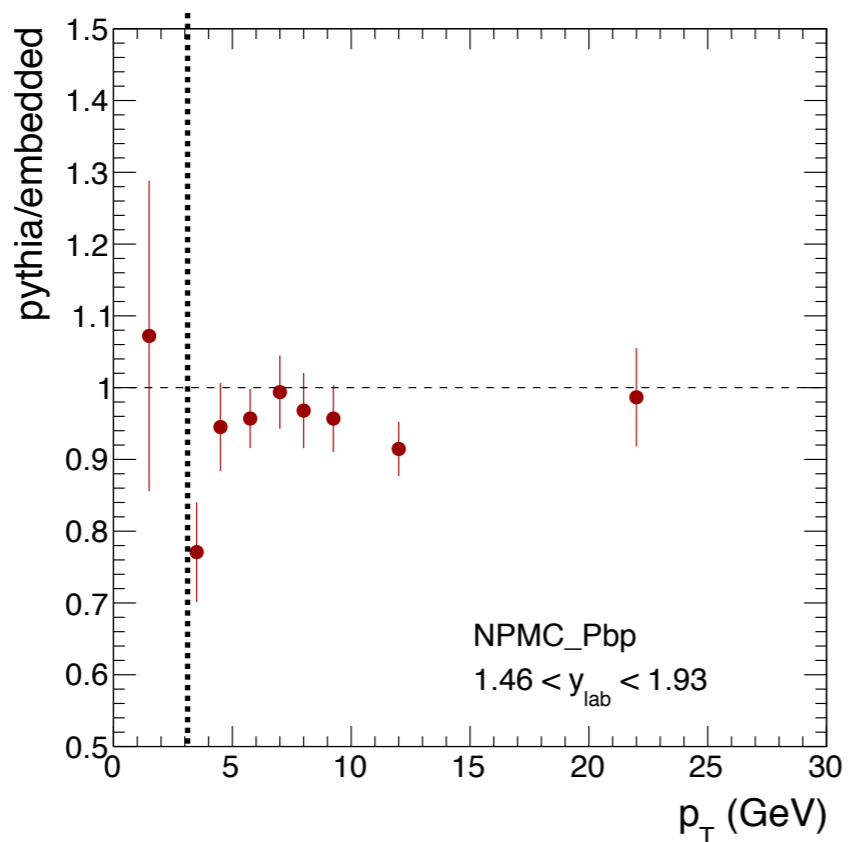
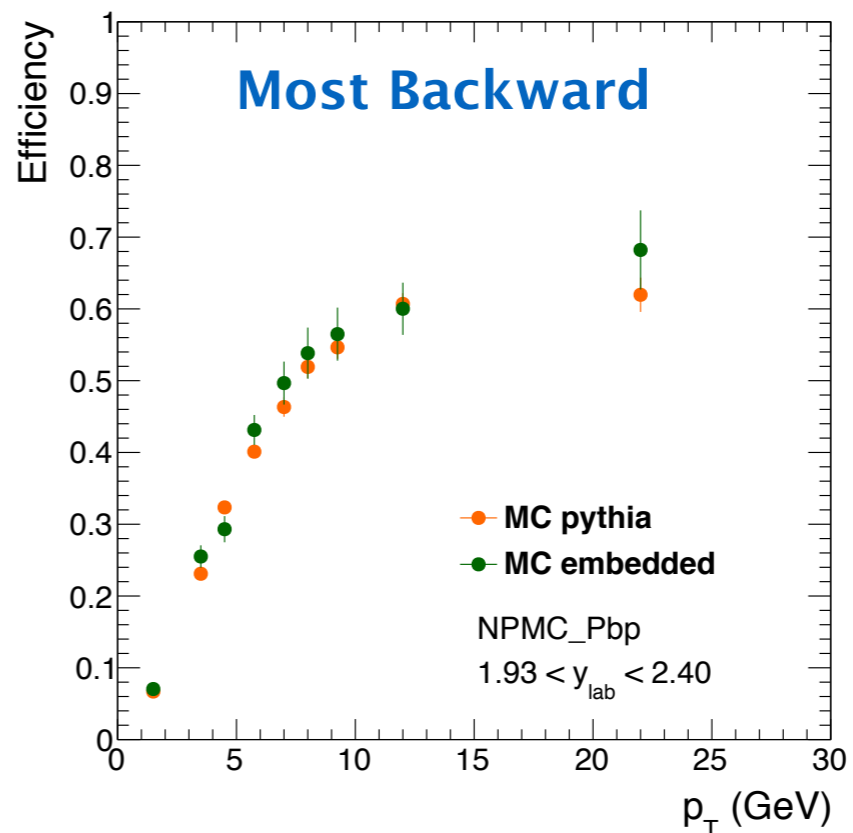
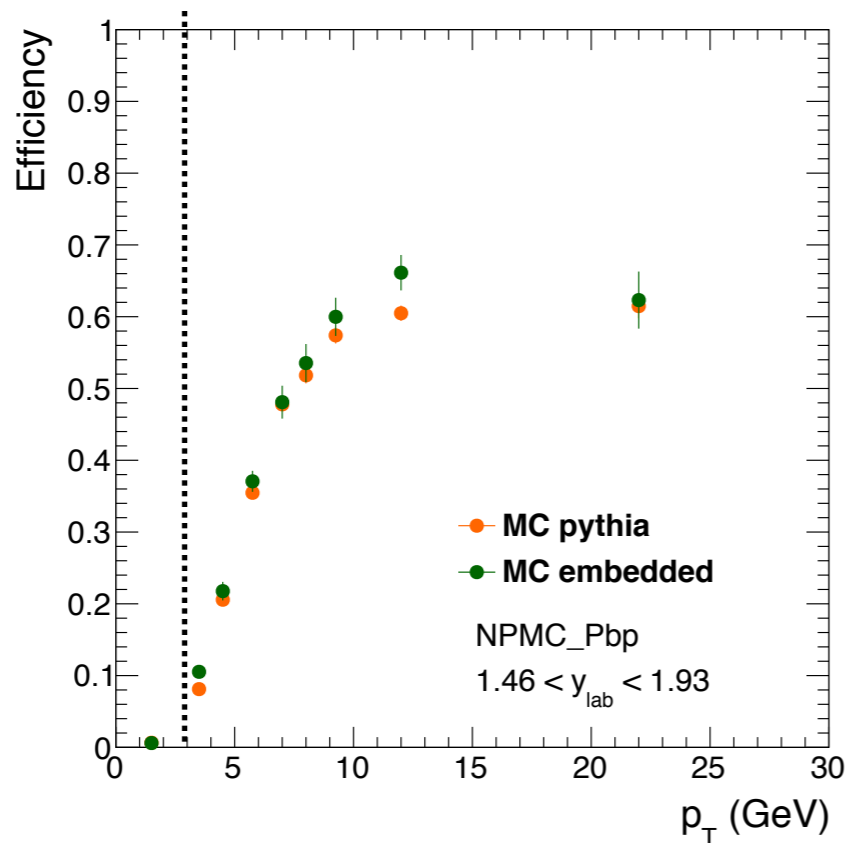


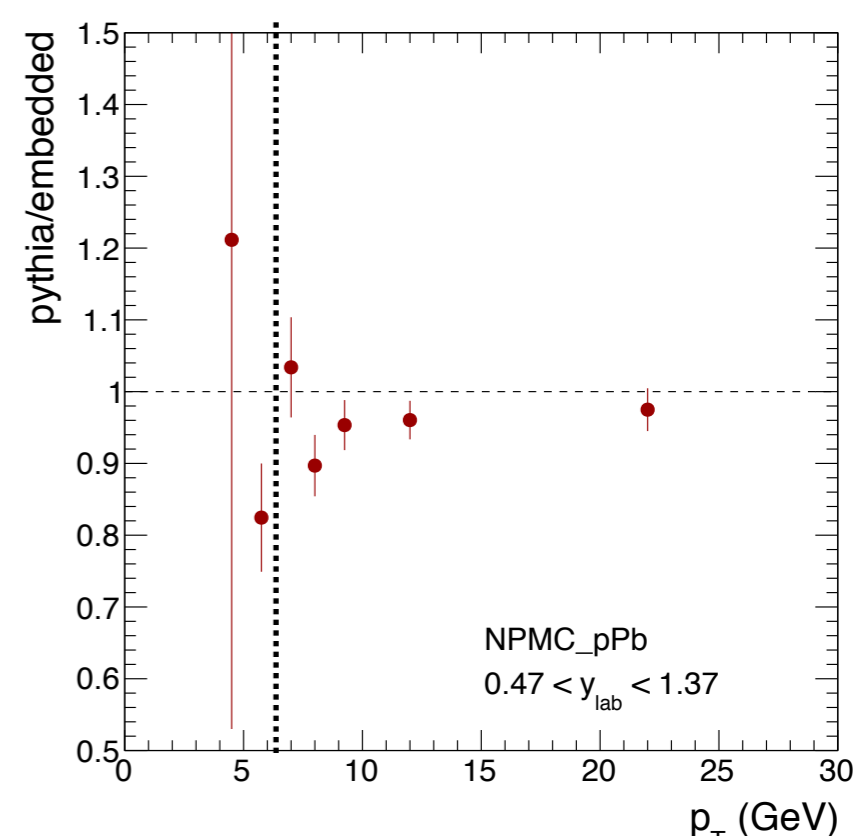
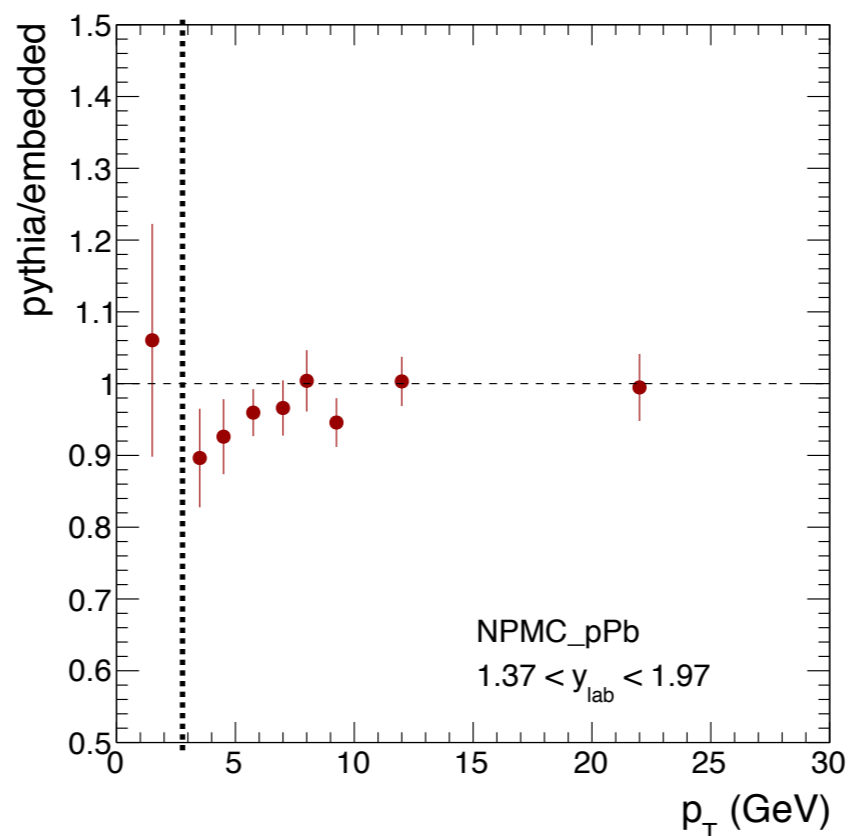
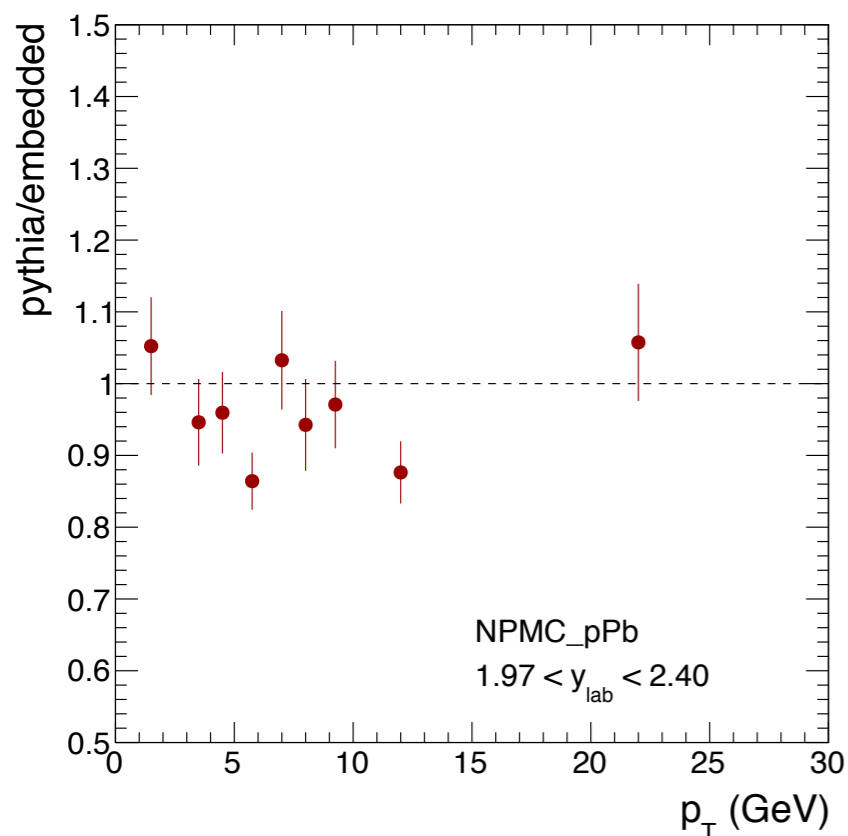
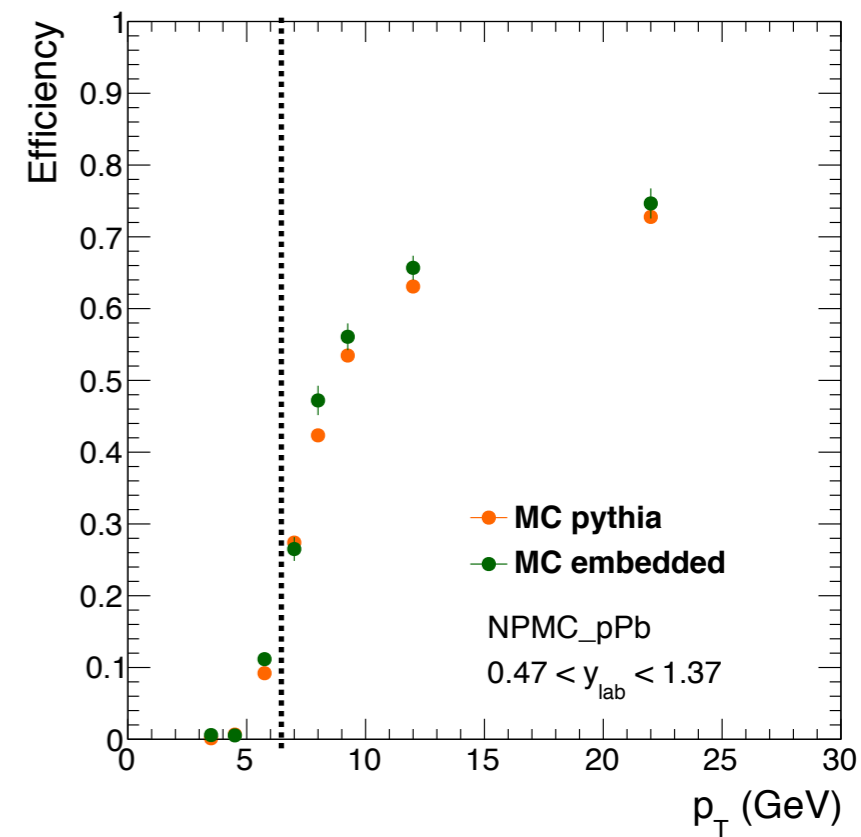
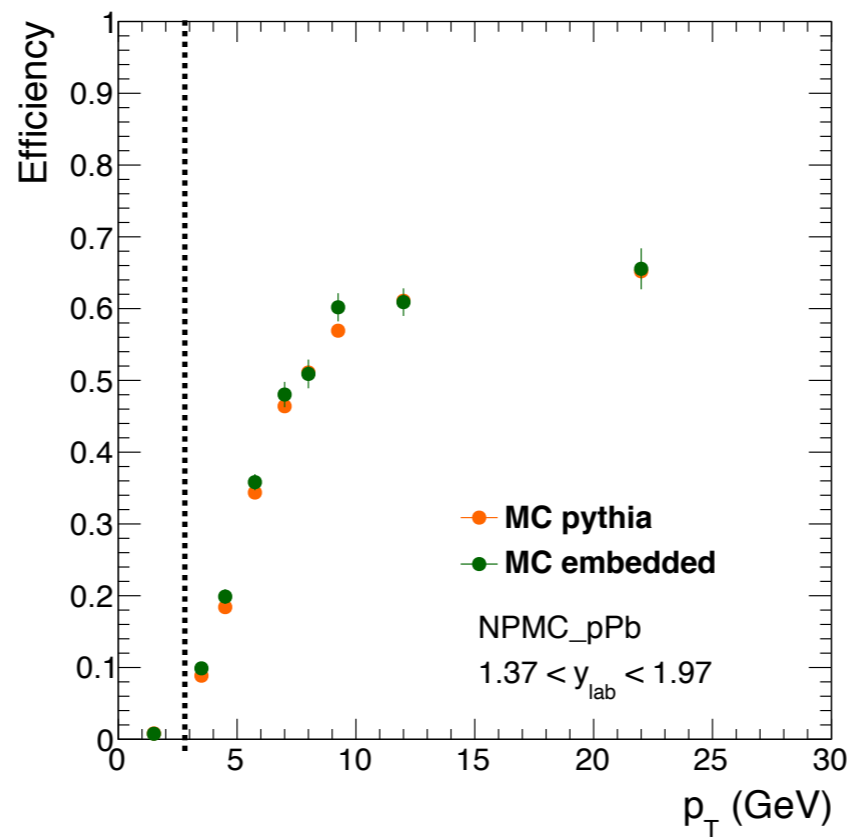
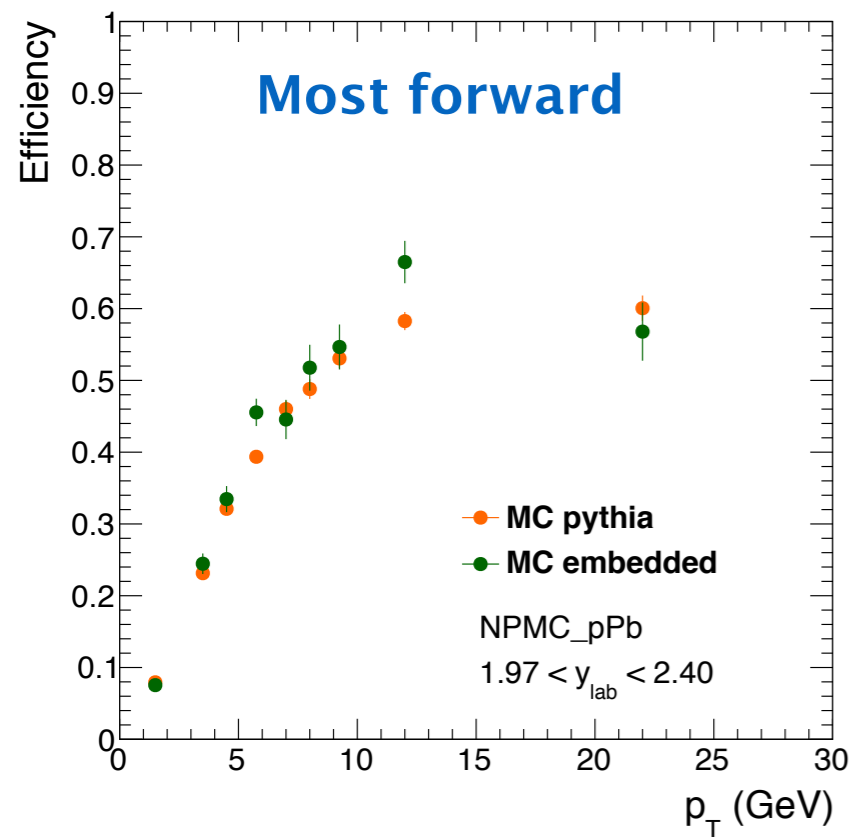


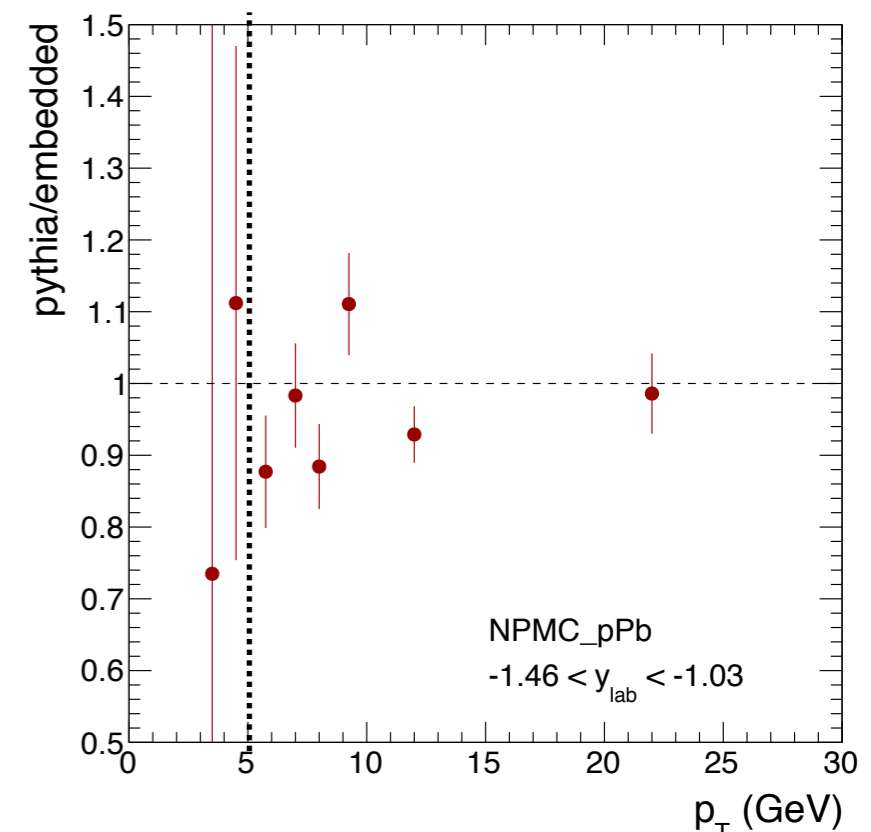
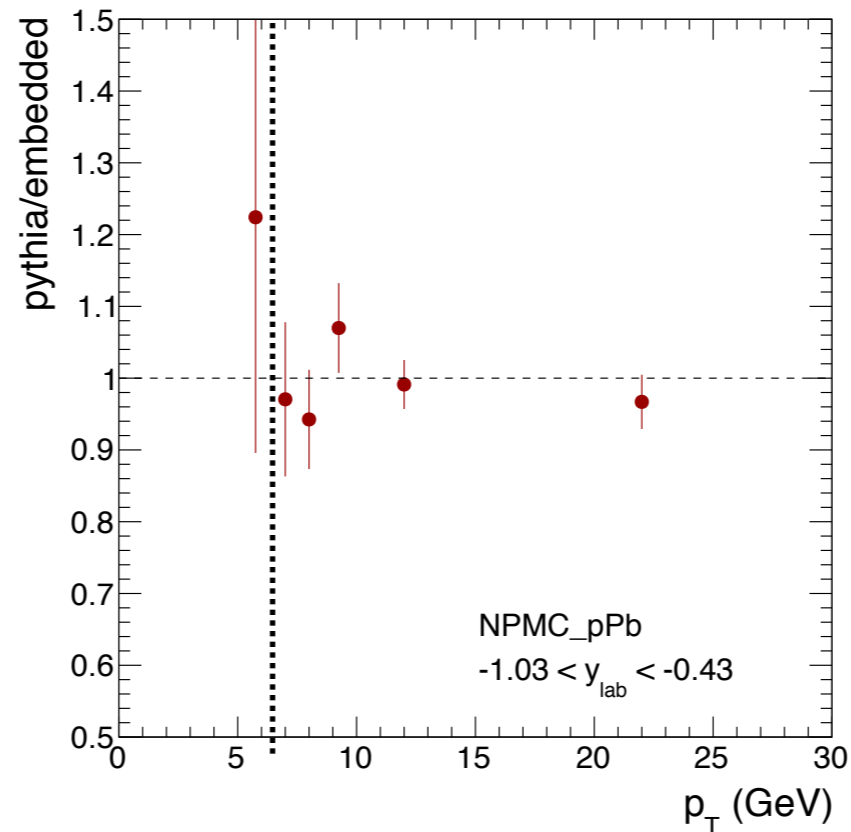
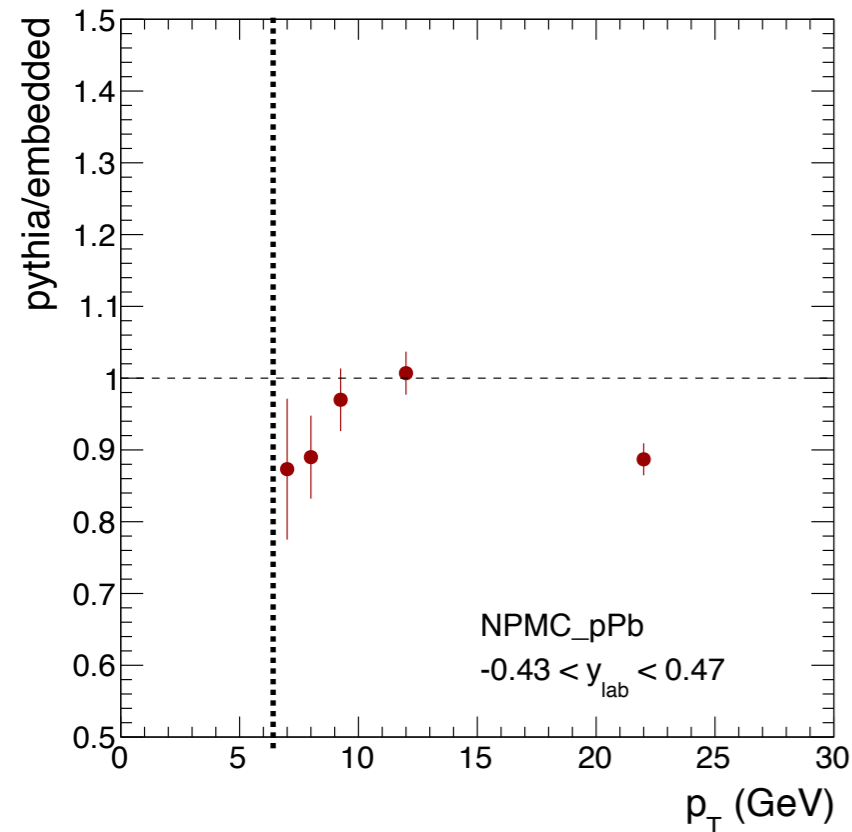
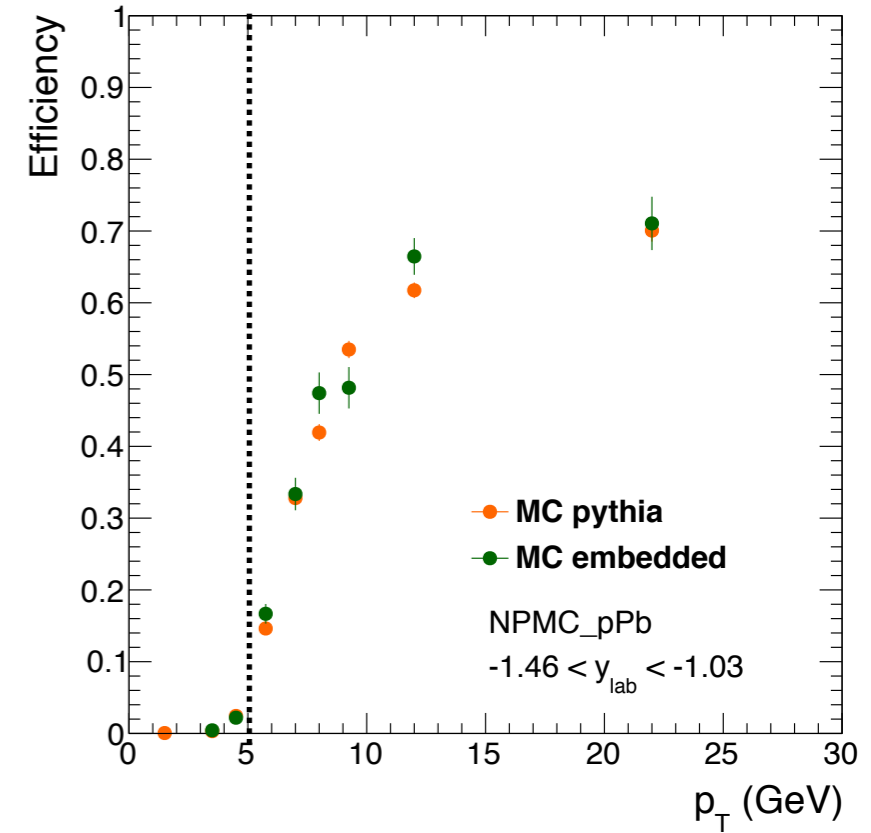
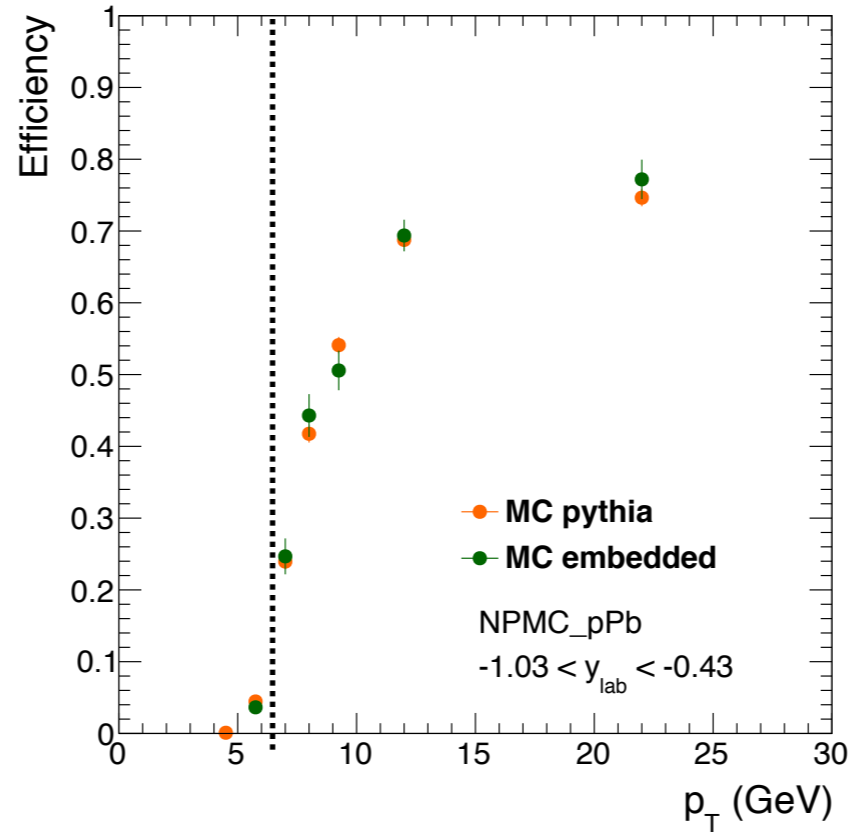
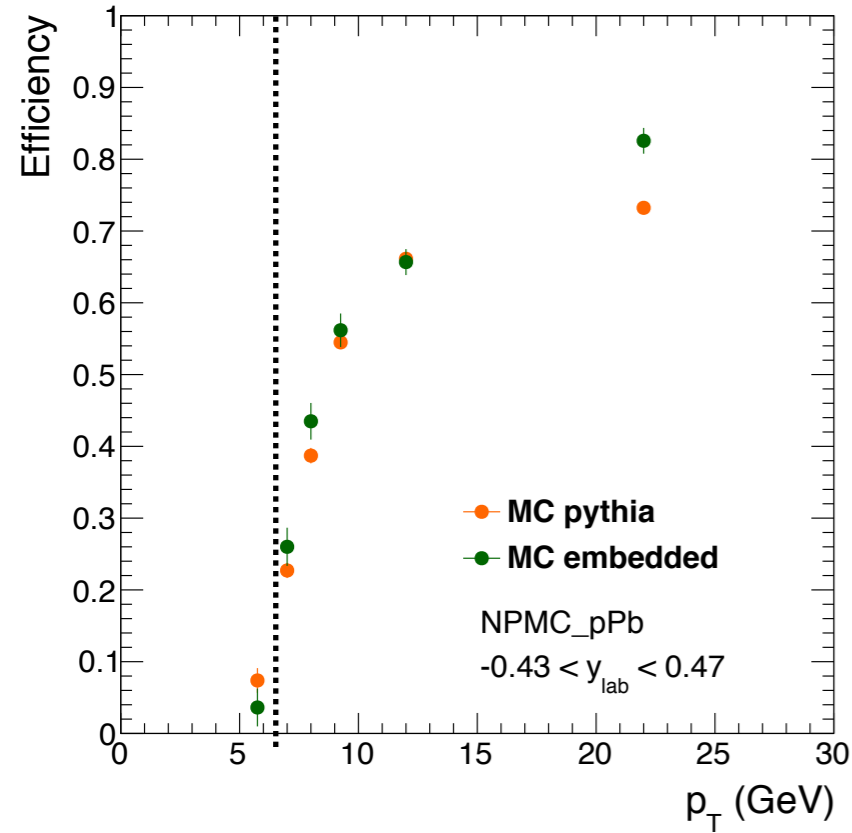




Non-prompt Pbp







Non-prompt pPb

