



Ξ_c^0 production via semi-leptonic decays in pp collisions at $\sqrt{s} = 13\text{TeV}$ with ALICE

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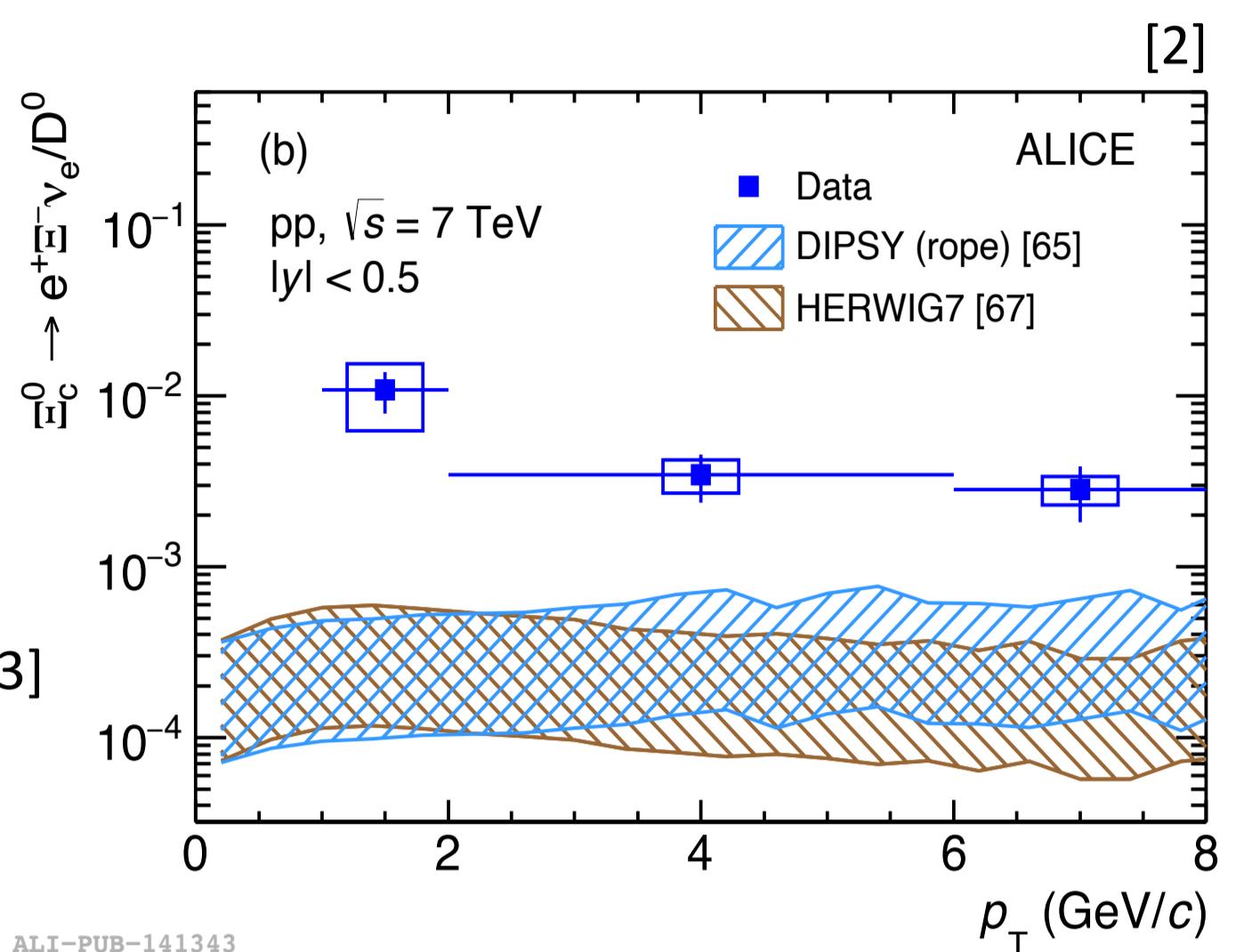


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Physics motivations

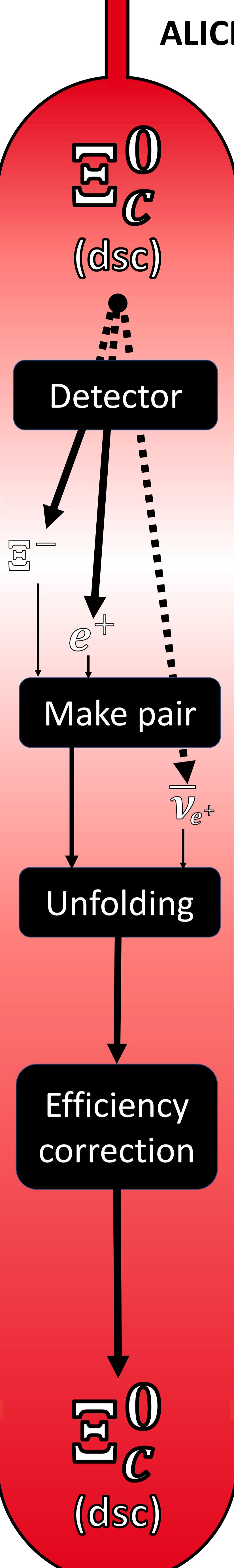
- Charmed hadrons in pp collisions

- Provide insights into the hadronization process.
- Provide new constraints on the fragmentation function of charm quarks.^[1]
- Study the relative production of charmed baryons to mesons.
- Constrain the observed enhanced production with respect to models.^[3]



ALICE Detector

- Minimum Bias Trigger, 1.88B events



Inner Tracking System (ITS)
Vertexing, tracking
 $|\eta| < 0.9$

Time Projection Chamber (TPC)
tracking, PID via dE/dx
 $|\eta| < 0.9$

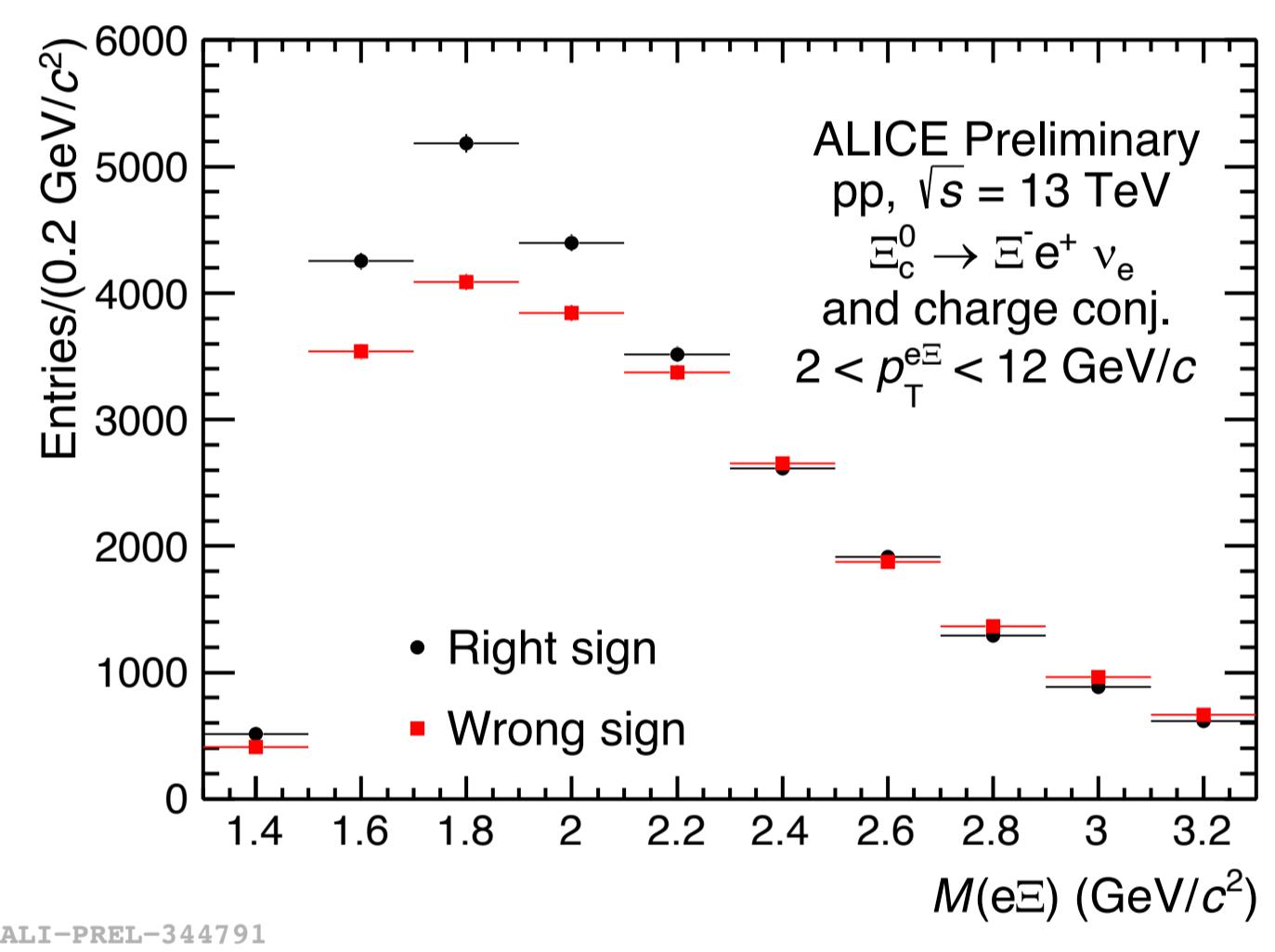
V0 Trigger
 $2.8 < \eta < 5.1$ (VOA)
 $3.7 < \eta < -1.7$ (VOC)

Time Of Flight Detector (TOF)
PID via time-of-flight
 $|\eta| < 0.9$

Signal extraction

- The Ξ_c^0 candidates are defined from e^+e^- pairs
- Electrons are identified using the TPC and TOF.
- The Ξ^- baryons are reconstructed from the decay chain :

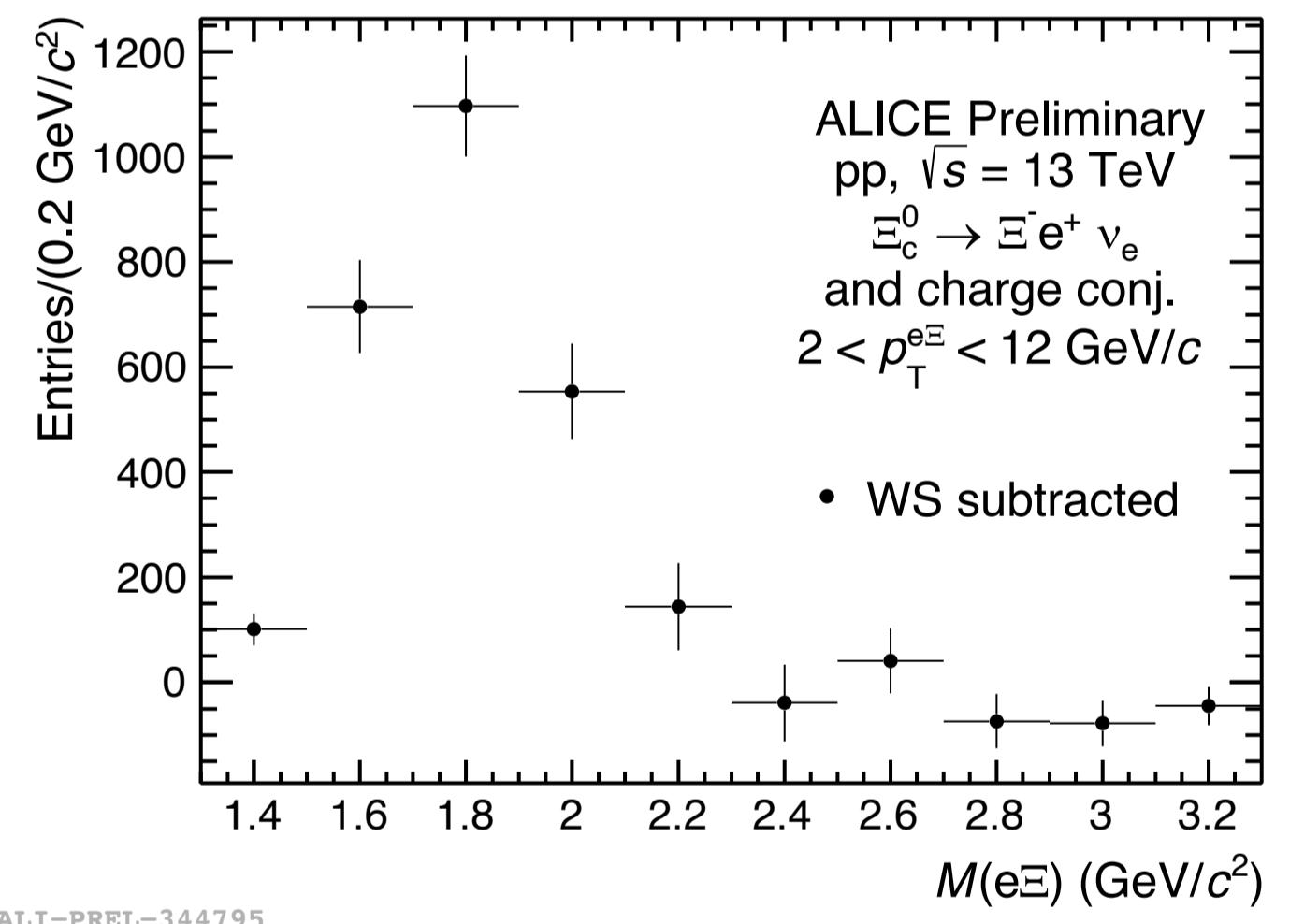
$$\Xi^- \rightarrow \pi^- \Lambda, \quad \Lambda \rightarrow p \pi^-$$



- Make e^+e^- pair
 - RS(Right Sign) and WS(Wrong Sign) are made.
→ RS : e^+e^- and e^-e^+
WS : e^+e^- and e^+e^-
 - WS pairs are used to estimate background .

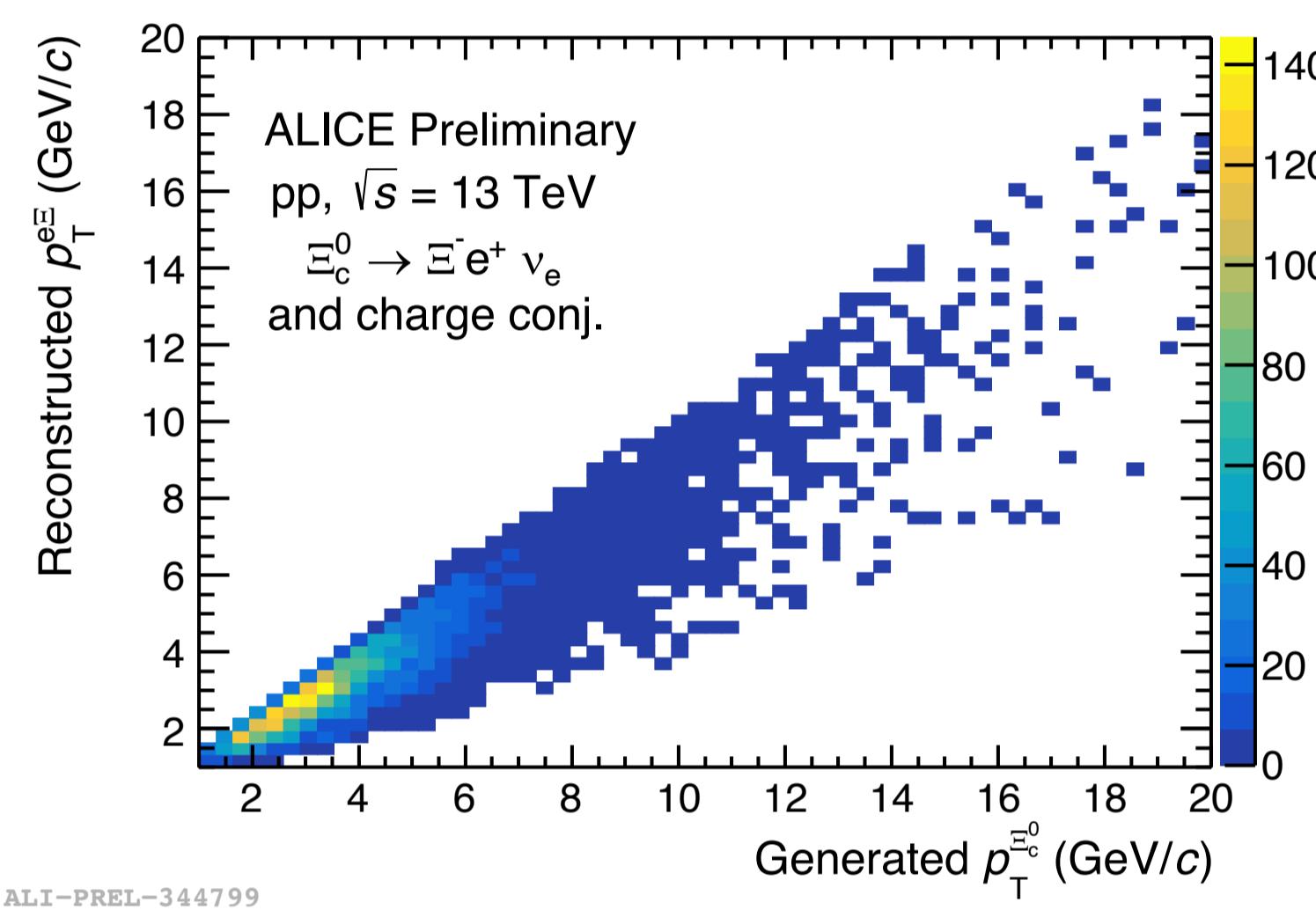
- Subtract WS from RS

- WS is subtracted from RS to remove the background and get raw yield.



Unfolding

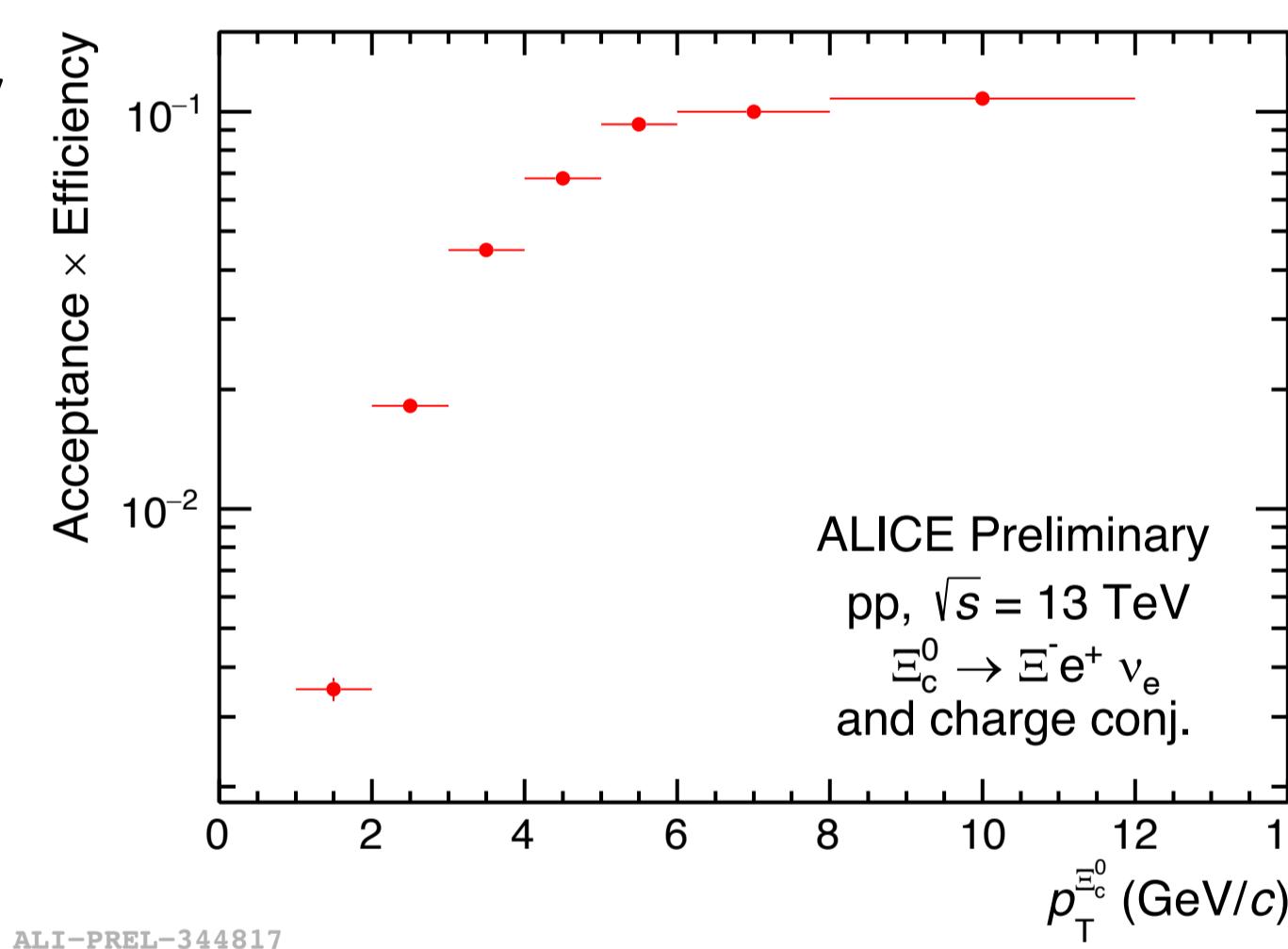
- Unfolding
 - $e^+e^- p_T$ is converted to $\Xi_c^0 p_T$ using response matrix.
- Response marix
 - Correlation of p_T between the Ξ_c^0 and e^+e^- pair using PYTHIA6.



Efficiency

- Inclusive efficiency

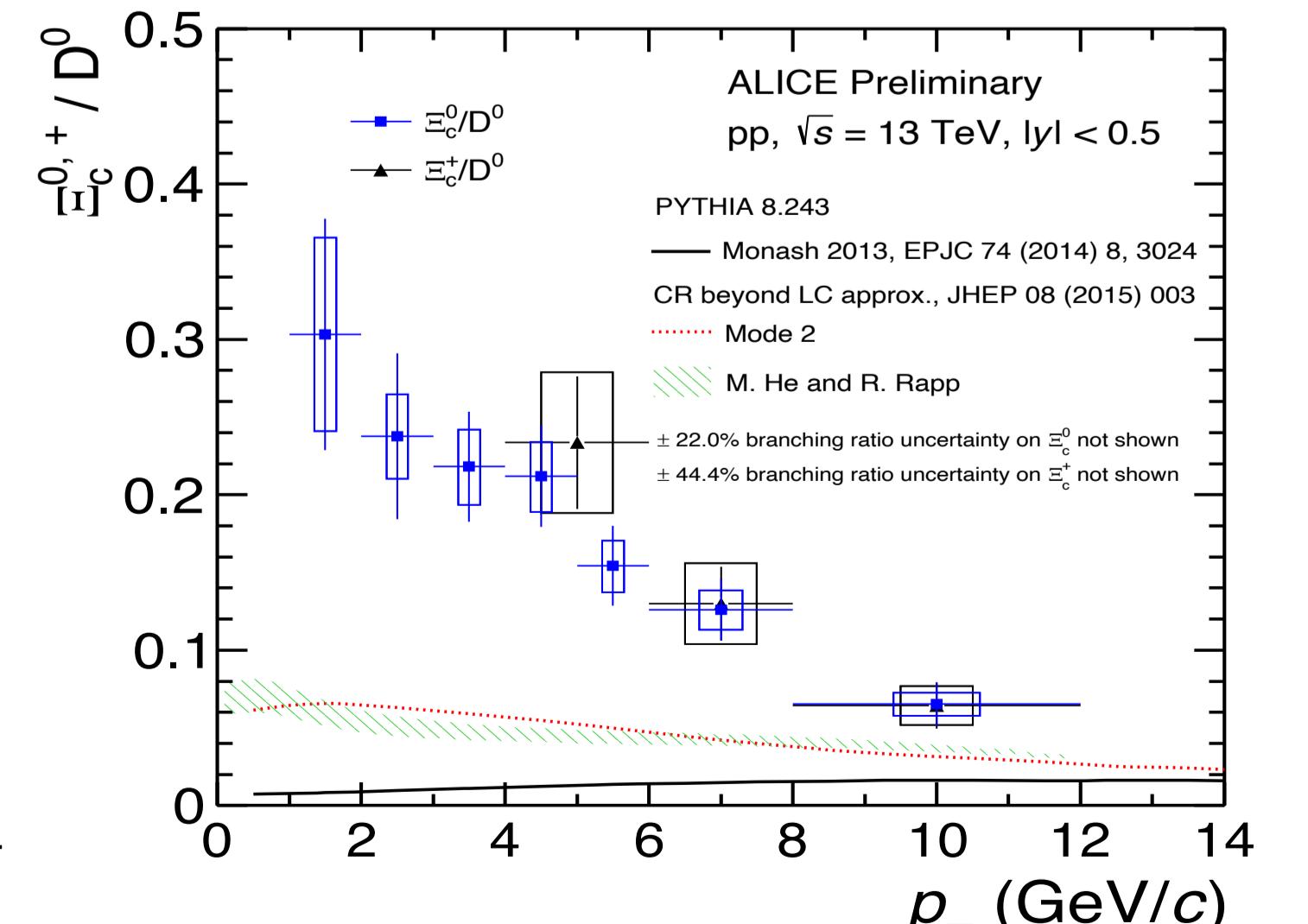
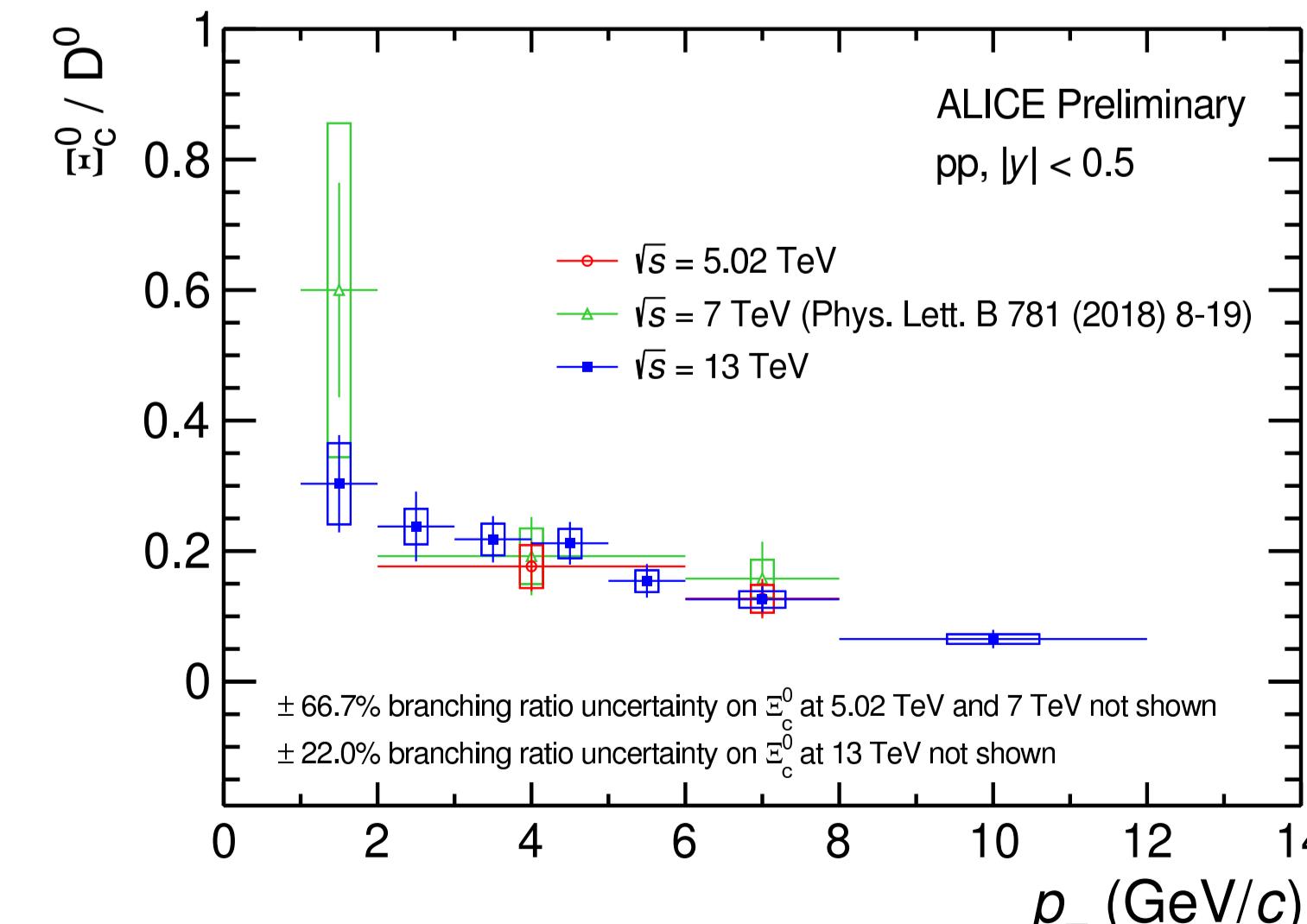
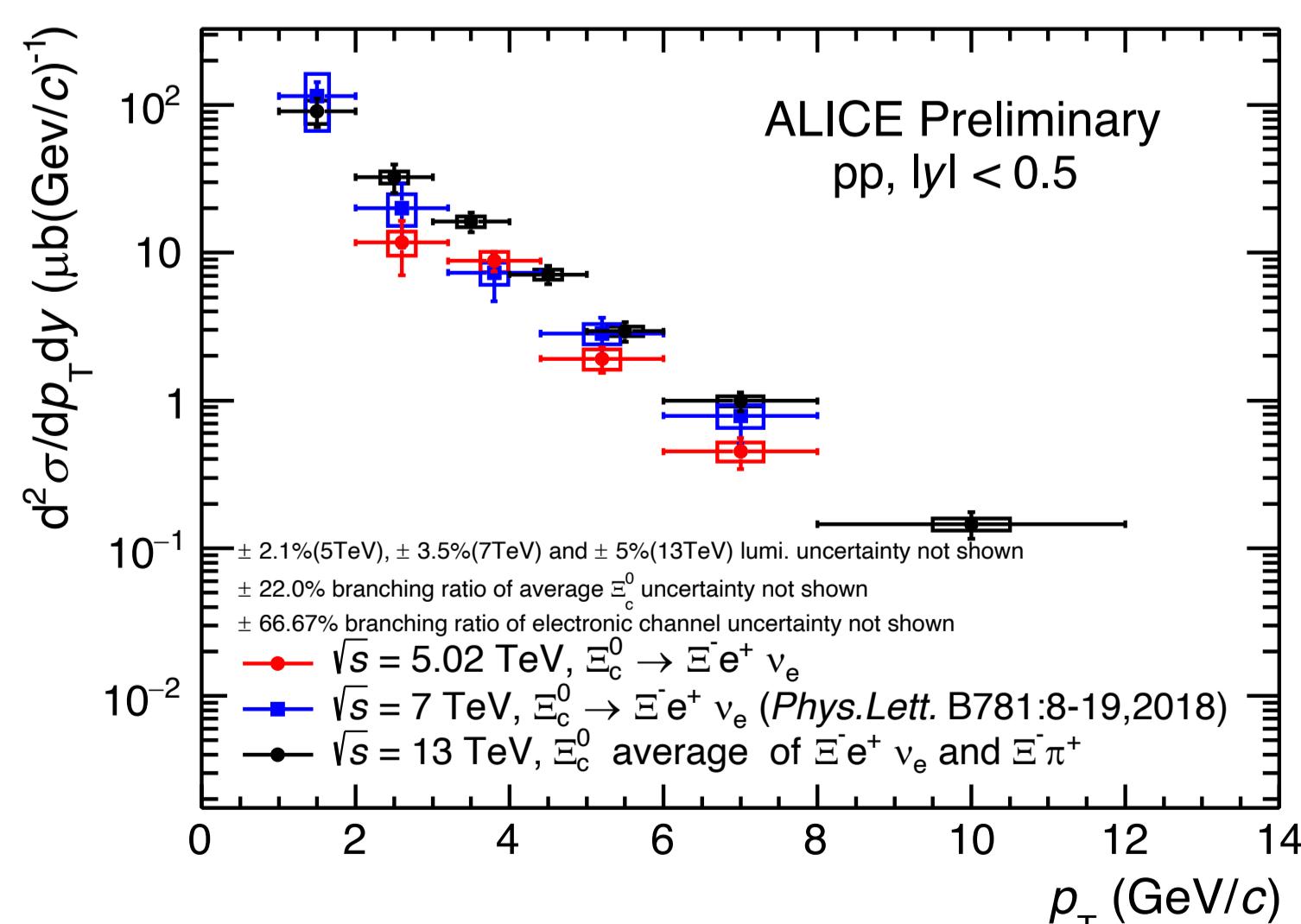
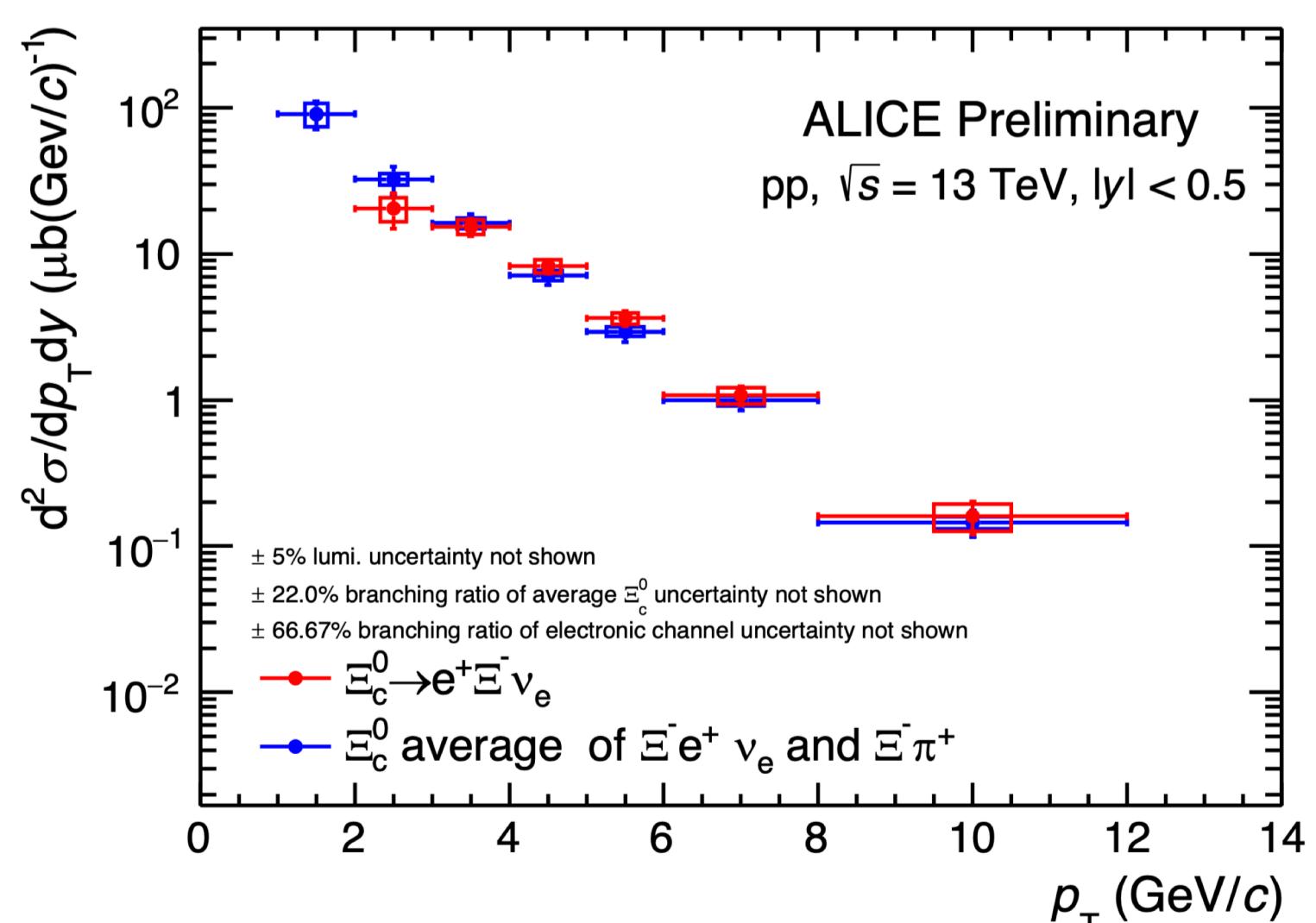
- Acceptance × Efficiency of Ξ_c^0 baryons generated in $|\eta| < 0.5$ decaying into $e^+e^- \nu_{e+}$ in PYTHIA6 and GEANT3 simulations.



Results

- Ξ_c^0 measurement

- Average of semi-leptonic and hadronic decay channel.
→ Semi-leptonic channel($\Xi_c^0 \rightarrow e^+e^- \nu_{e+}$) : $2 < p_T < 12 \text{ GeV}/c$
hadronic channel ($\Xi_c^0 \rightarrow \Xi^- \pi^+$) : $1 < p_T < 12 \text{ GeV}/c$



References

- [1] Phys. Rev. C79 (2009) 044905
 [2] JHEP 08 (2015) 003
 [3] Phys.Lett. B781:8-19,2018

CENUM

