

A first look @ Exclusive K^+ with EIC

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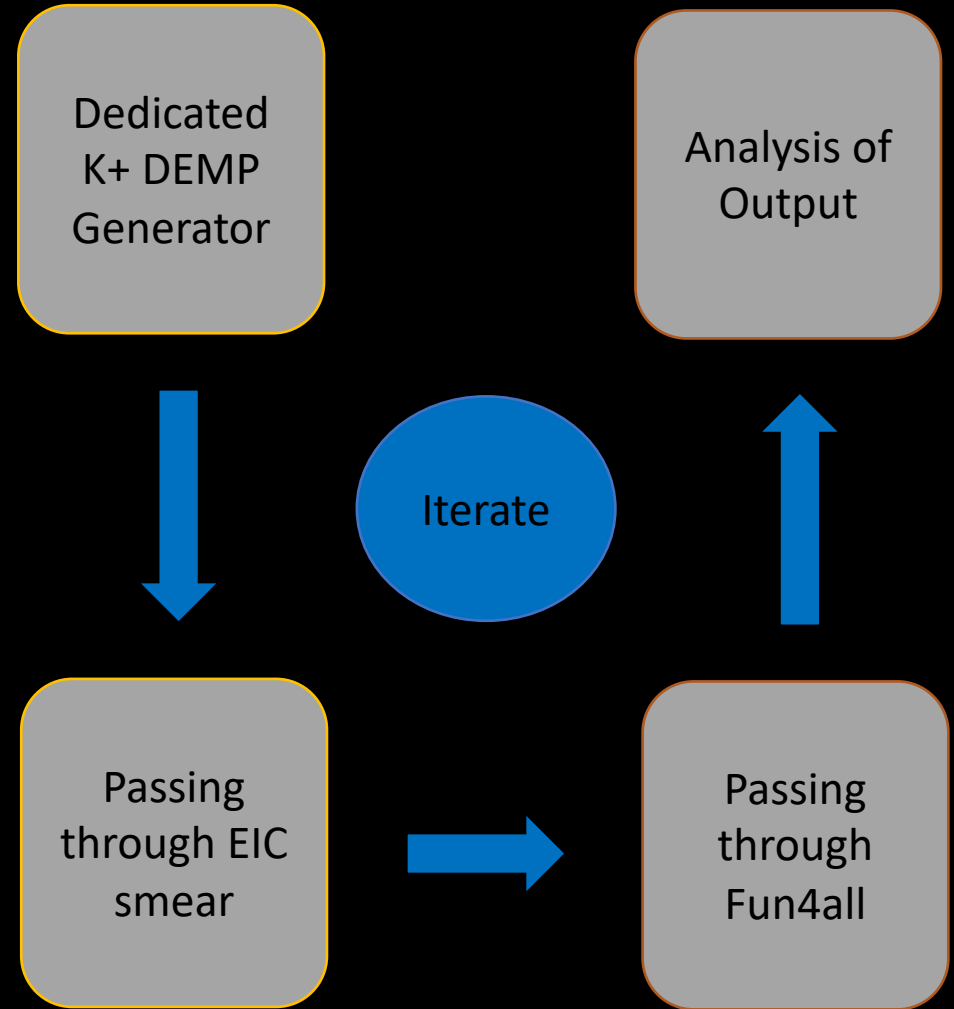
Introduction

Challenging Measurement

- A triple coincidence needed with reasonable precision
- Two unique channels (Λ and Σ^0)
- Critical to precisely separate Λ and Σ^0 decays

Specific Detector Requirements

- ZDC, Tracking, Hadron Endcap
- Roman pots (maybe)
- Off-momentum detectors (maybe)



Events Produced

- Produced some events using Kaon DEMP generator for the simulation campaign.
- Only using 5on41 beam energy combination initially.
- Only phase space studies (no weighting included).

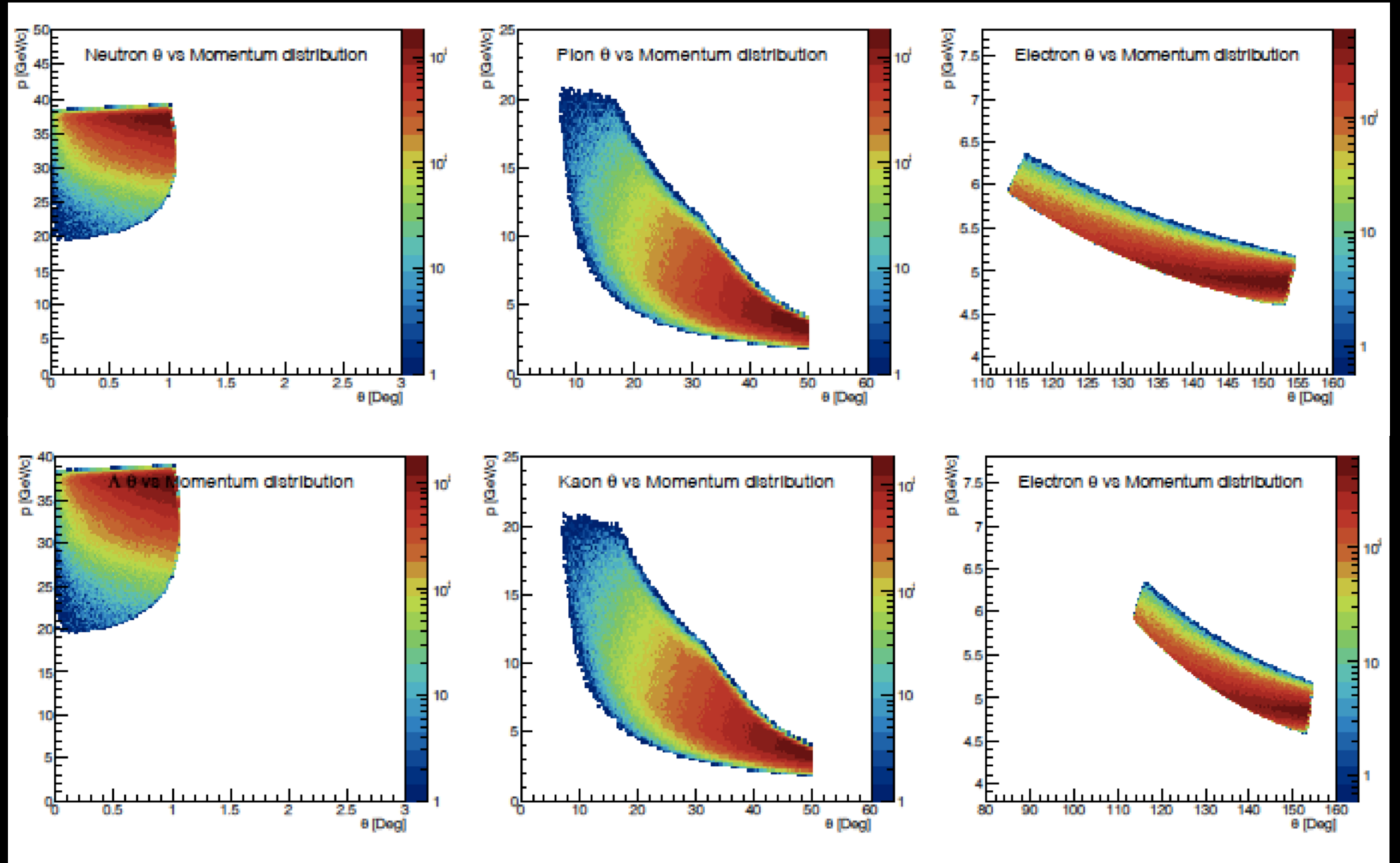
Channel	ECCE (Pythia Format) ATHENA (HEP MC)	Events Recorded
$e + p \rightarrow e' + K^+ + \Lambda$	10 x 1B ($Q^2 \geq 5$)	~ 1.7 M
	10 x 1B ($Q^2 \geq 3$)	~ 5.3 M
$e + p \rightarrow e' + K^+ + \Sigma^0$	10 x 1B ($Q^2 \geq 5$)	~ 1.6 M
	10 x 1B ($Q^2 \geq 3$)	~ 5.2 M

$$\pi^+ v/s K^+$$

➤ $Q^2 \geq 5$

➤ $-t < 0.5$

Pion



Kaon

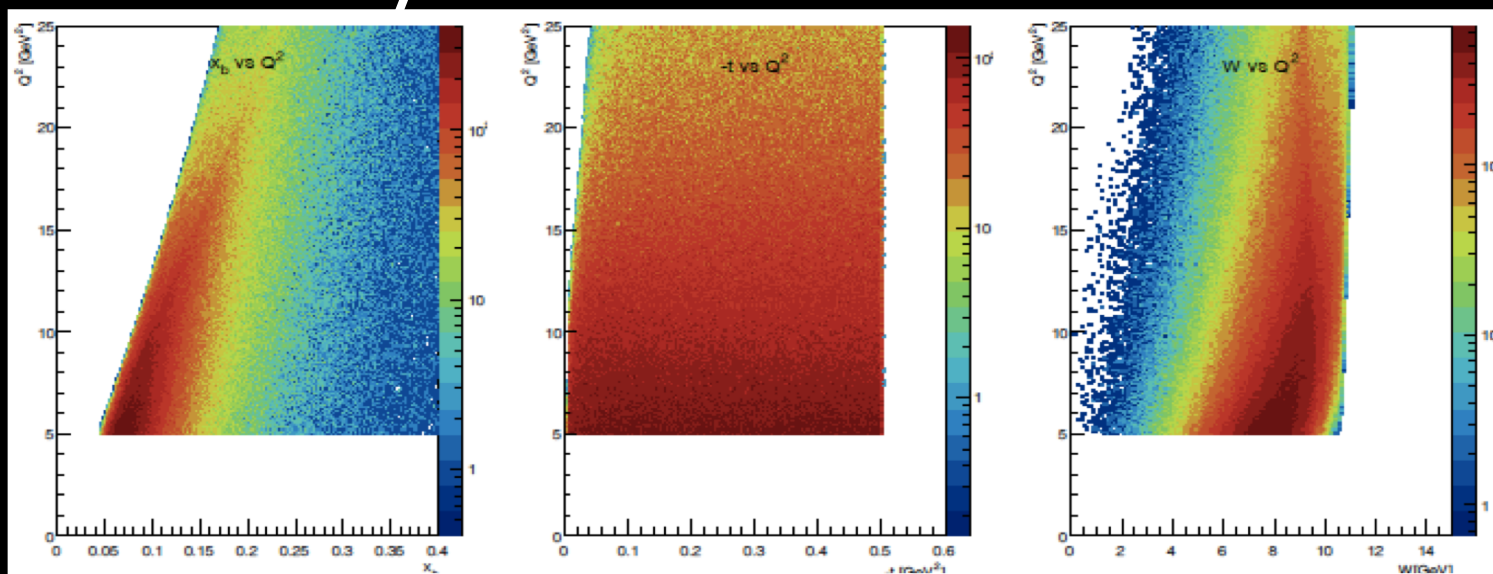


$$\pi^+ v/s K^+$$

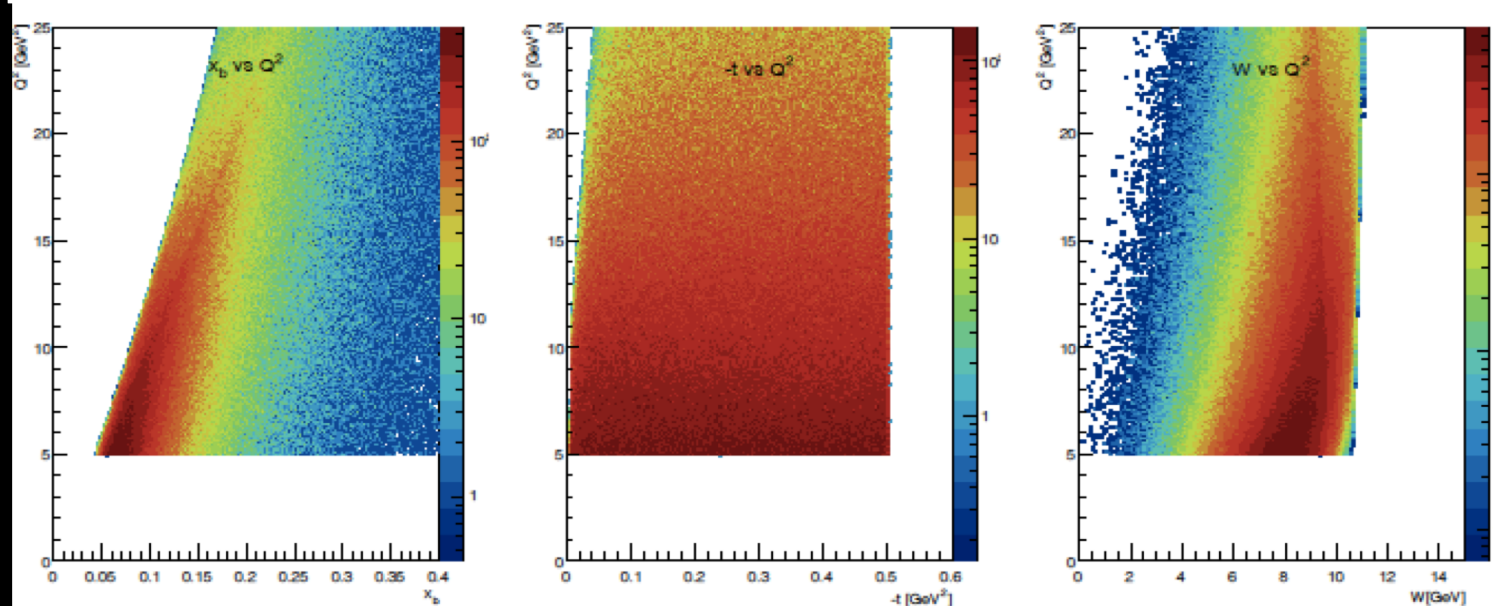
➤ $Q^2 \geq 5$

➤ $-t < 0.5$

Pion



Kaon

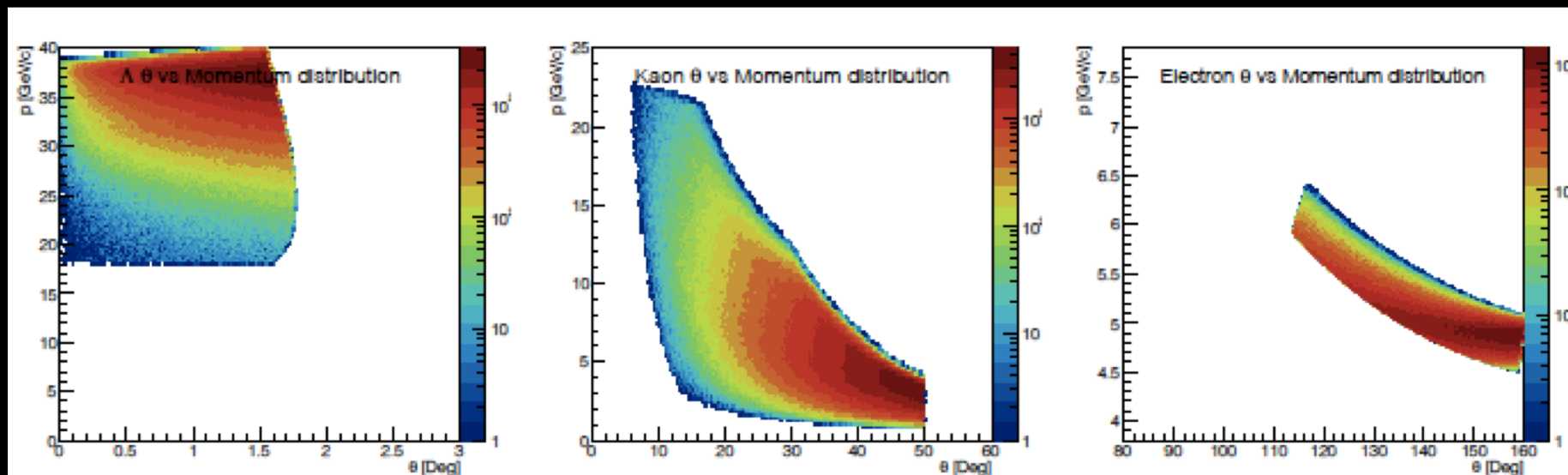


$$\Lambda v/s \Sigma^0$$

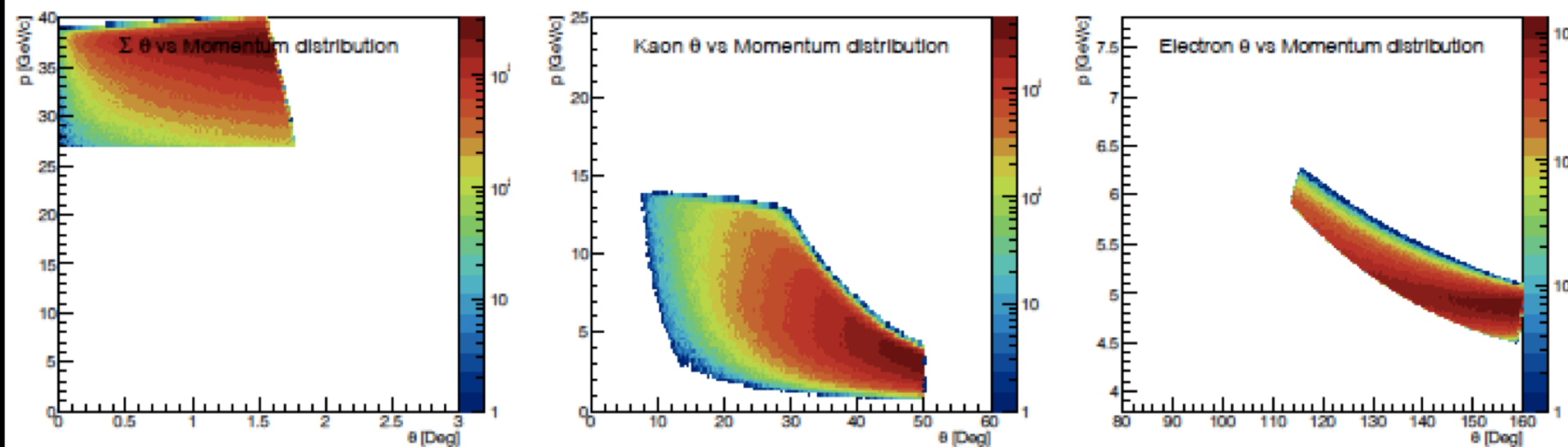
➤ $Q^2 \geq 3$

➤ $-t < 1.2$

Λ



Σ^0

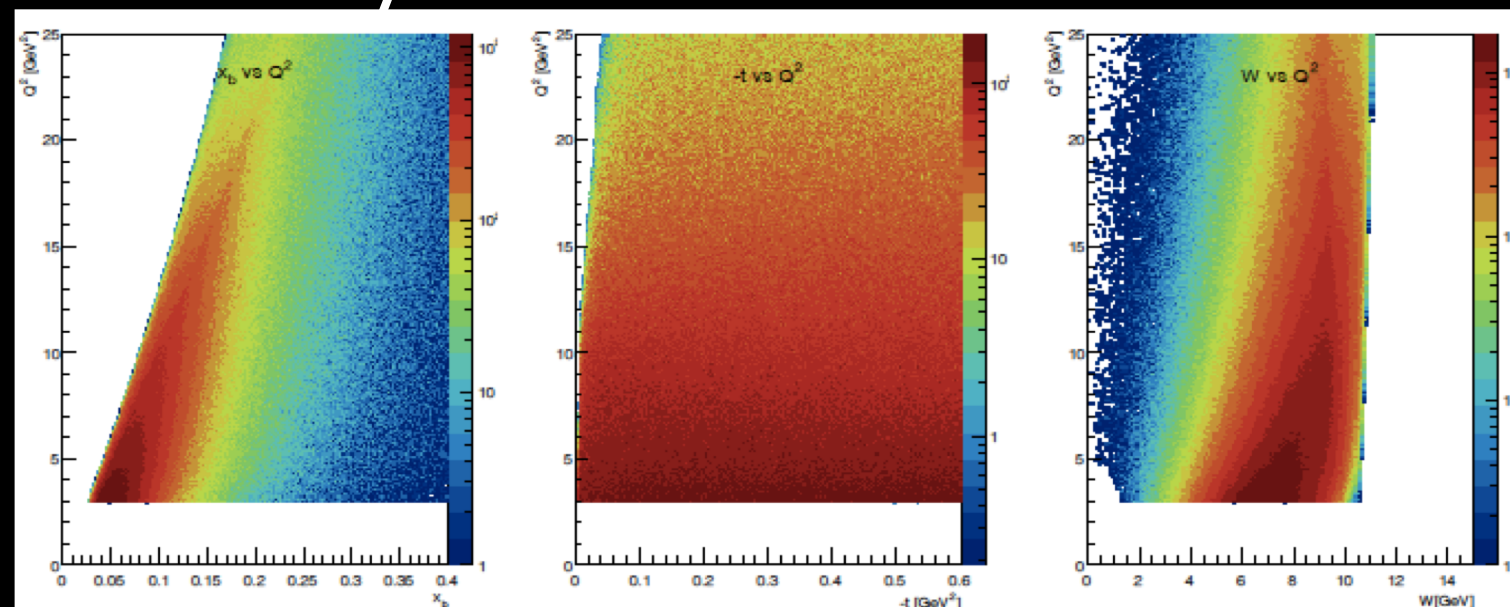


$\Lambda v/s \Sigma^0$

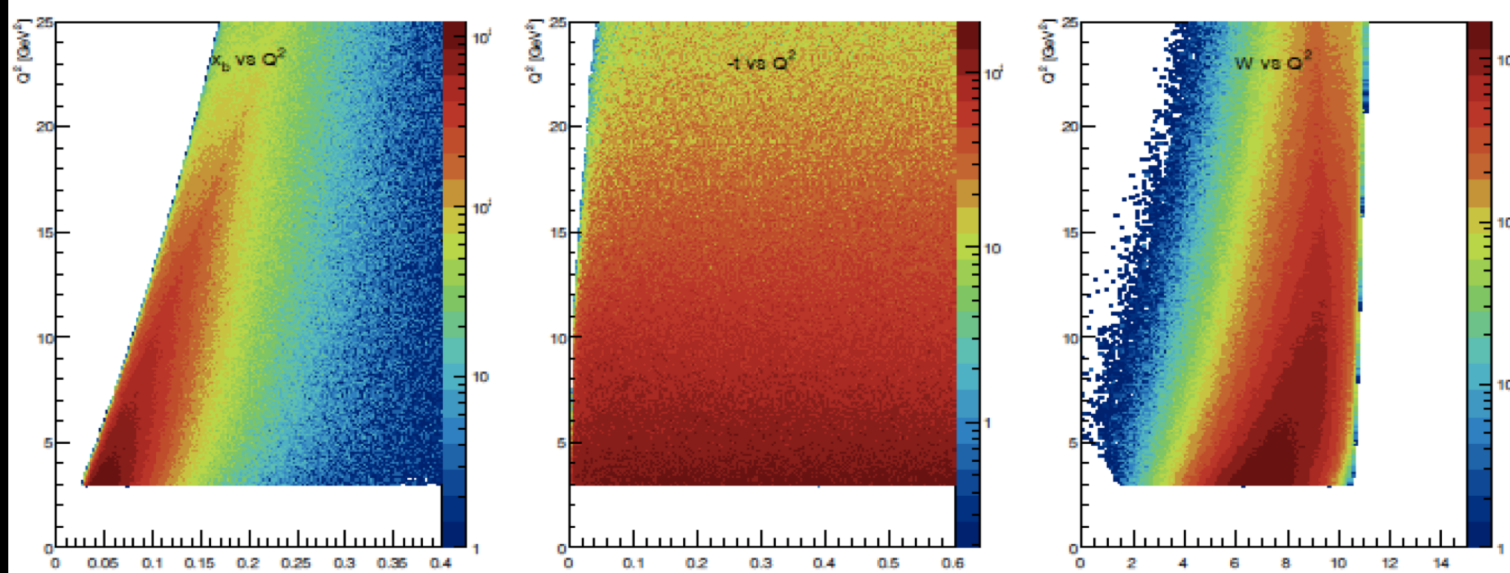
➤ $Q^2 \geq 3$

➤ $-t < 1.2$

Λ



Σ^0



Summary and Outlook

- Kaon DEMP generator is up and running for both Λ and Σ^0 .
- Generated events with 5on41 energy (no weighting) for both ECCE and ATHENA.

Outlook

- Small fixes to the generator.
 - Conservation Law
 - Improved cross-section and weights
- Analysis of the output files from simulation campaigns
 - Λ and Σ^0 separation and reconstruction
 - Detector resolutions (especially ZDC) and detector positioning
- Test other beam energies and both IRs with different proto-collaborations.