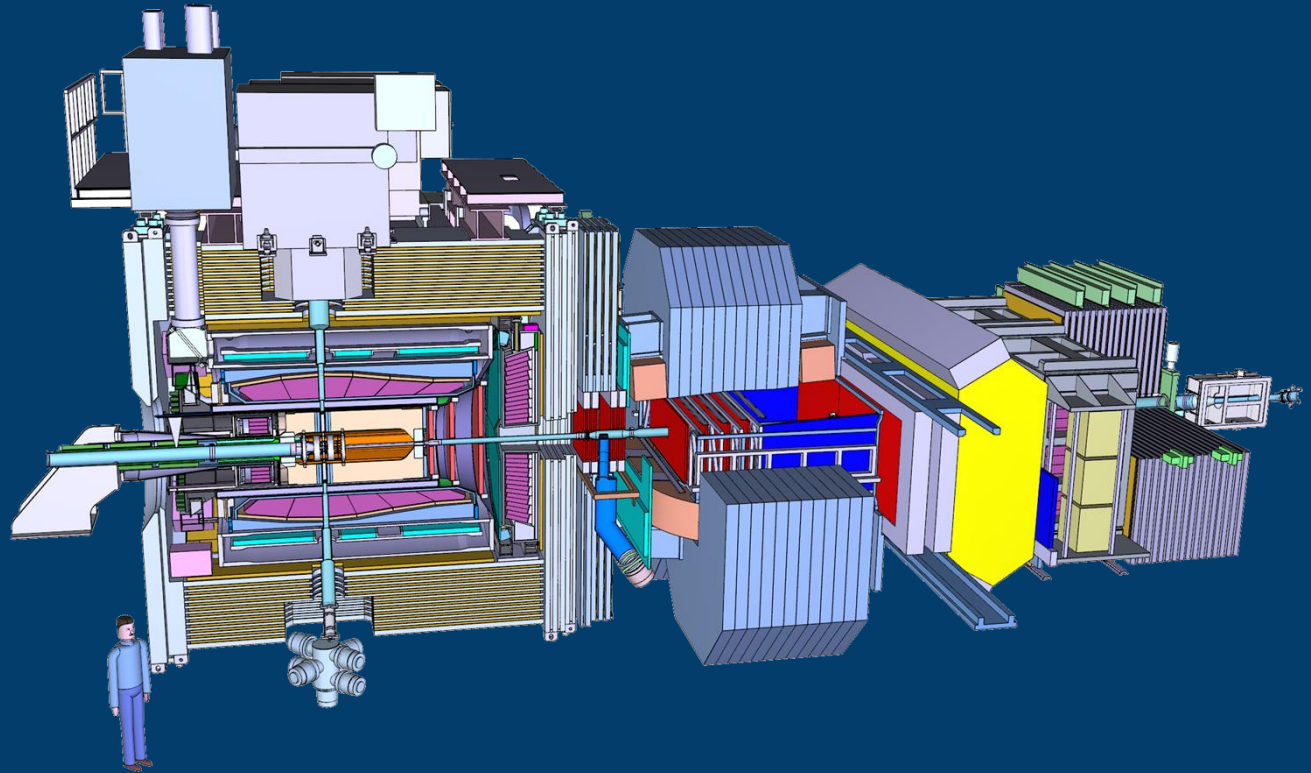# Λ Reconstruction with Realistic Track Finding for PANDA

21.10.2022 I MU DAYS 2022 | ANNA ALICKE | IKP 1 - FZJ

HYPERON RECONSTRUCTION WITH PANDA

- Investigate non-perturbative QCD:
  - binding mechanisms between quarks in hadron
  - Discrepancies between theoretical models and experimental data
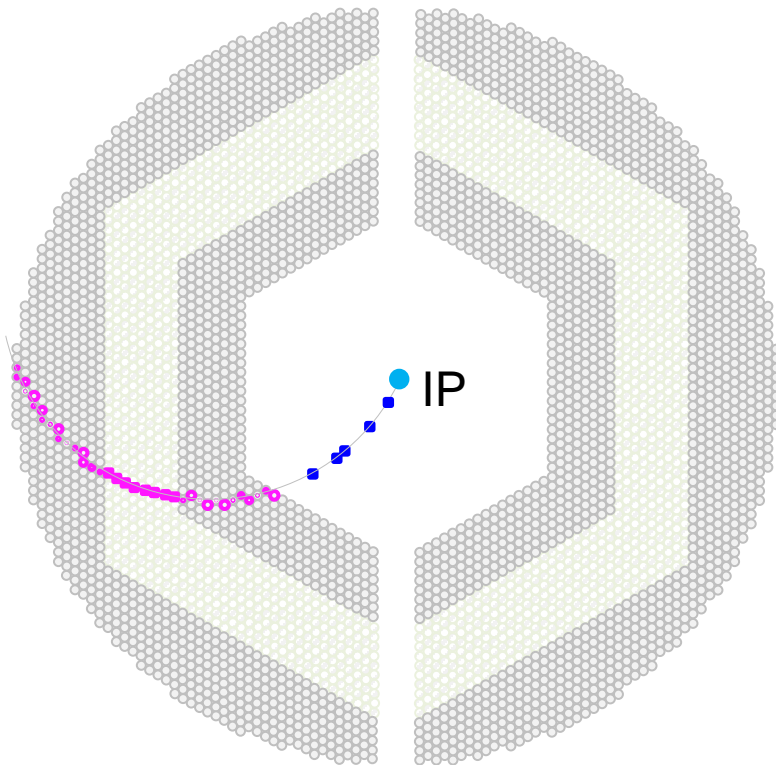- **Hyperons**: hadrons containing at least one strange quark

→ Secondary track finding is important for hyperon reconstruction
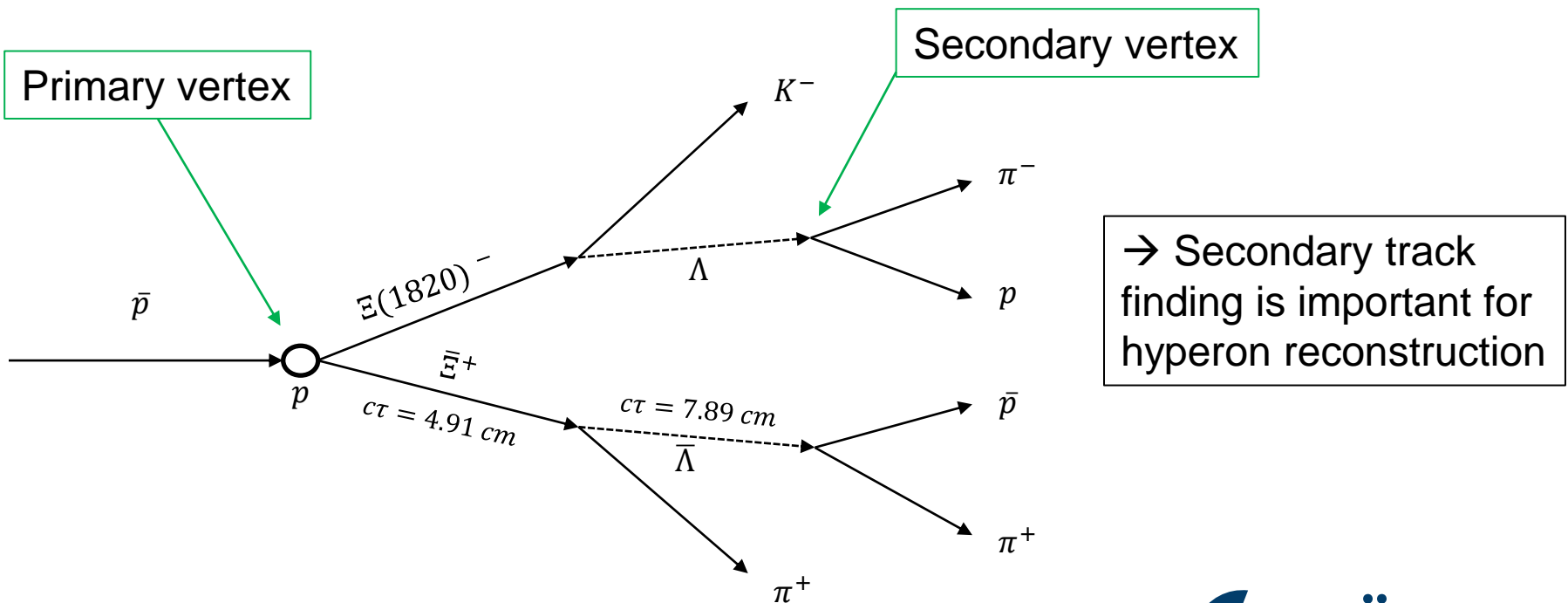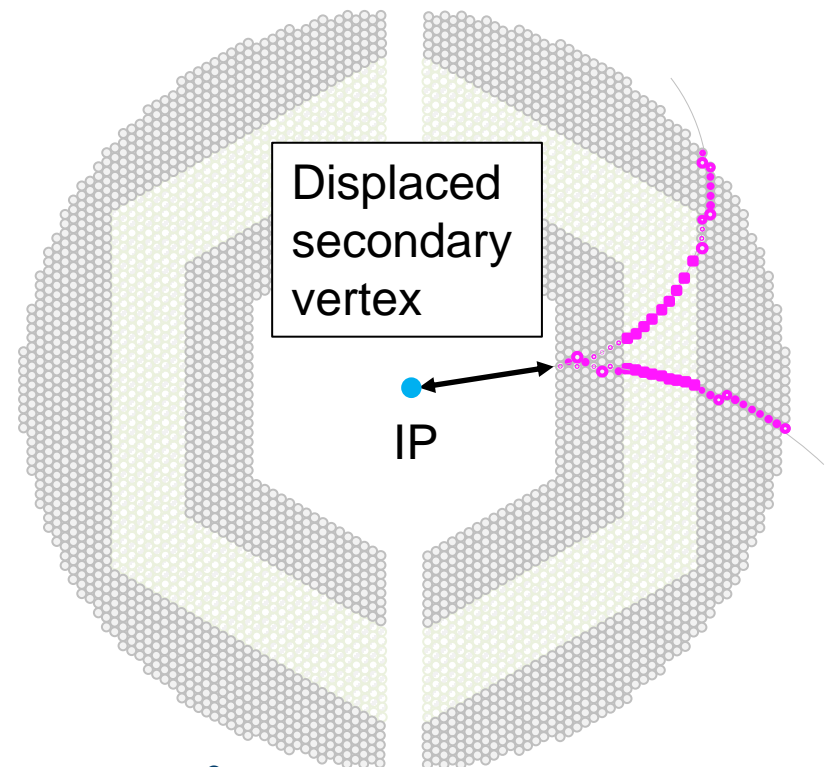
SECONDARY TRACKING

Primary tracks

Track originates from initial interaction point (IP)
→ One precise point given

Secondary tracks

Track has a displaced secondary vertex
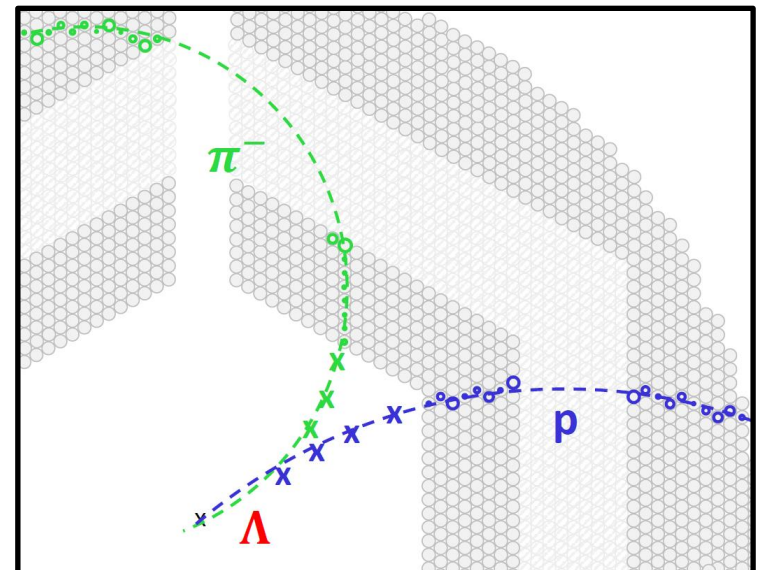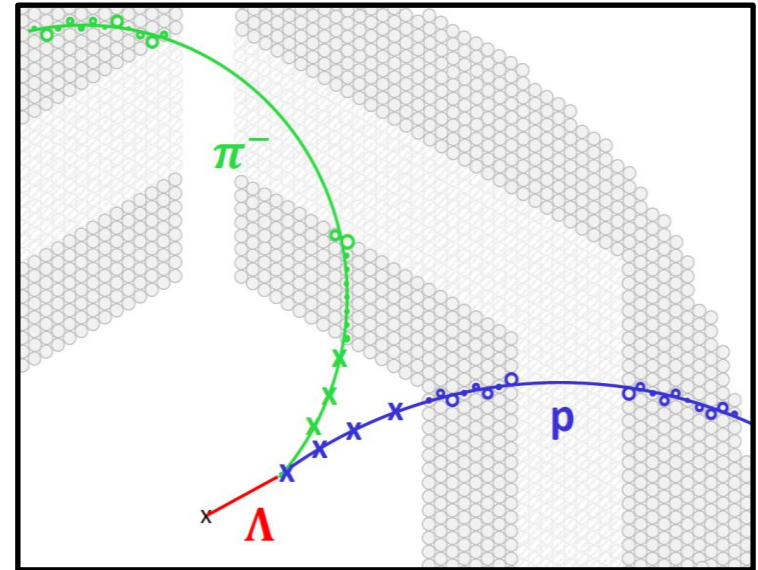→ much more difficult (higher combinatorics)

IP

Displaced secondary vertex

IP

Tracking Efficiencies and Λ Reconstruction Efficiency

Simulated data: 400,000 events of

$$p\bar{p} \to \Xi(1820)^- \bar{\Xi}^+ \to \Lambda K^- \bar{\Lambda} \pi^+ \to \boldsymbol{p}\boldsymbol{\pi}^- K^- \pi^+ \bar{p}\pi^+$$

	ε_P	ε_{π^-}	ε_Λ
Ideal Tracking + Kalman	94.5 %	84.4 %	45.4 %
Standard (Primary)	71.5 %	49.4 %	3.6 %
Hough (Primary)	73.1 %	58.5 %	10.8 %
Standard + Secondary	82.1 %	58.2 %	12.4 %
Hough + Secondary	80.2 %	61.2 %	18.6 %

SUMMARY

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- Secondary track finder strongly improves finding rate of final state particles

- Reconstruction efficiency of Λ strongly improved

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Thank you for your attention!