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Strangeness tracking with ALICE

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Strangeness tracking with ALICE in Run 3

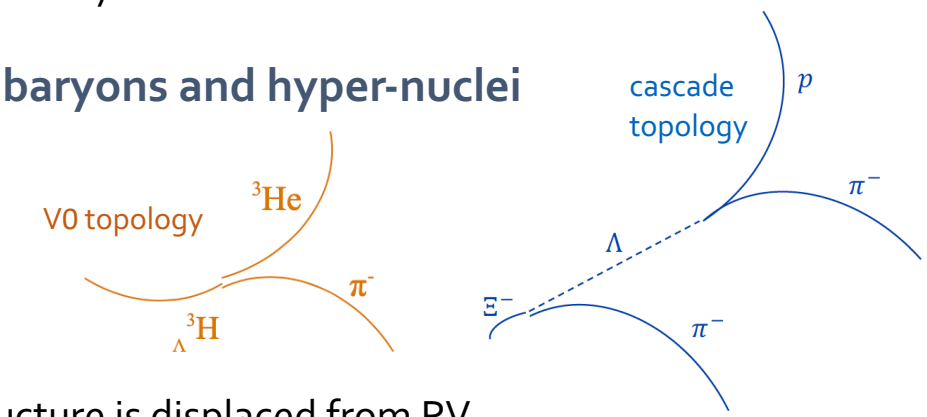
ALICE Inner Tracking System in Run 3 (ITS2)

- ITS2 has a 7-layer all pixel design
  → Precise weak decay daughter tracking
- Innermost layer is located at 22.4 mm from IP
  → Silicon pixels very close to the interaction vertex

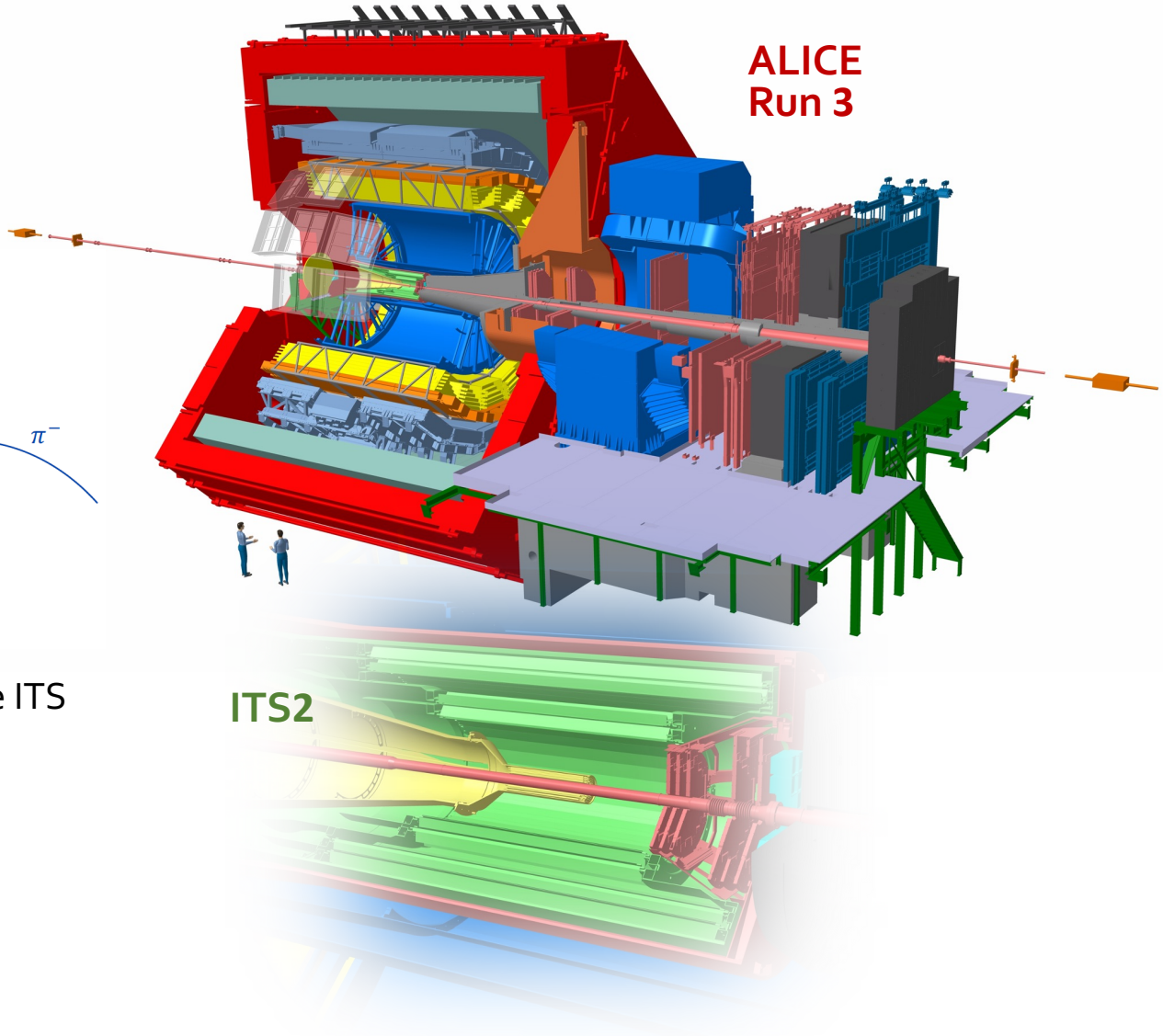
(Multi-)strange baryons and hyper-nuclei

Hyper-triton
($c\tau = 5.4$ cm)

Ξ^- baryon
($c\tau = 4.91$ cm)



→ weak decay structure is displaced from PV
→ Strange objects are likely to be detected by some layers of the ITS



Strangeness tracking strategy

Combine **direct detection** of tracklet in ITS with information of **topological reconstruction** from weak decay daughters

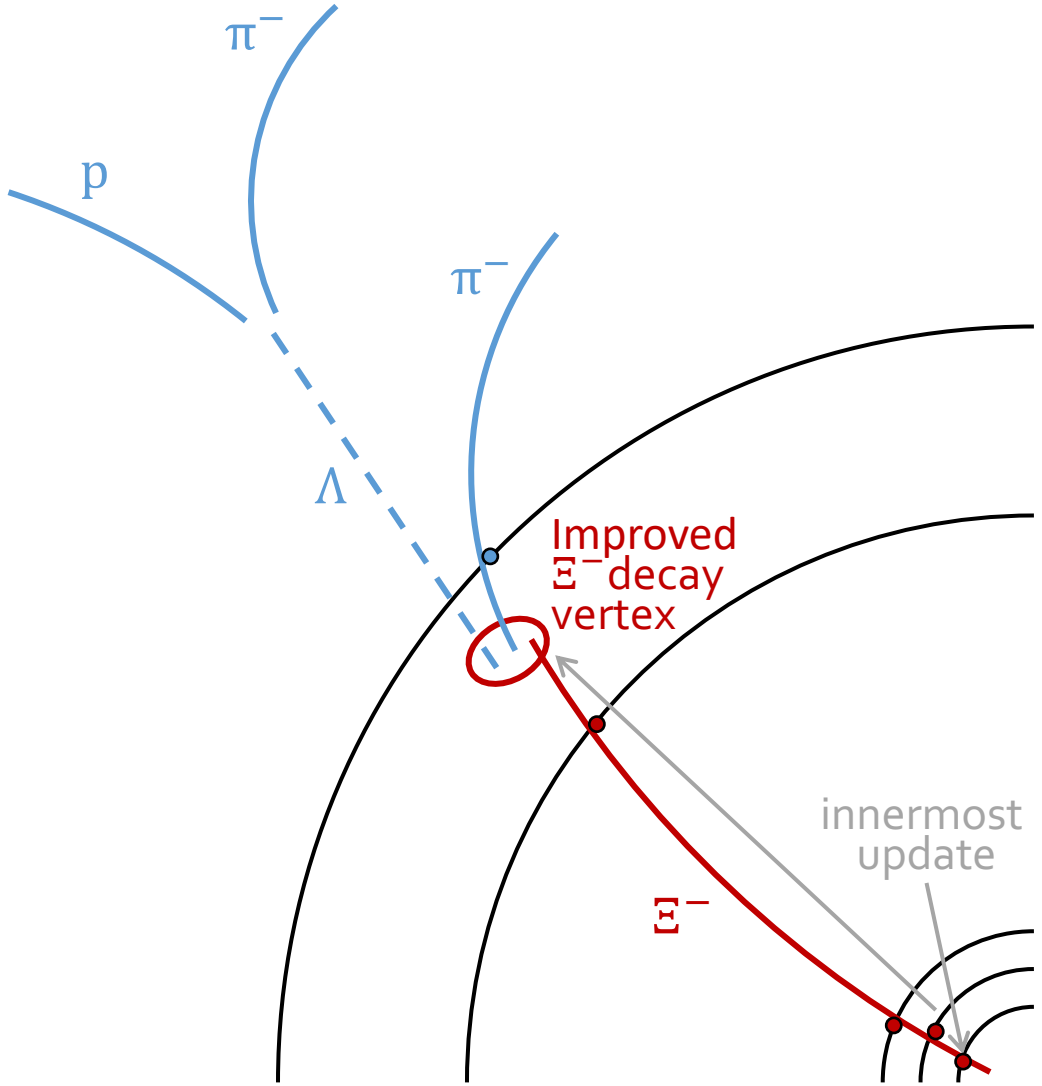
Strangeness tracking with ALICE in Run 3

Ξ baryon detection in the ITS2 with the KFParticle package

- Reconstruction of Ξ baryon from its **daughter particles** using the KFParticle package
- Search for **ITS tracklet that is compatible** with the reconstructed cascade within a common η-φ region
- **Best possible mother at decay vertex:**
  Constrain cascade parameters at reconstructed decay vertex using measured parameters at the innermost update (IU) of ITS tracklet
- **Best possible mother at innermost update:**
  Constrain mother parameters at innermost update of ITS tracklet with cascade parameters at reconstructed decay vertex

KFParticle usage

→ Use of KFParticle package for vertex reconstruction
→ Development of additional constraint in KF code



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