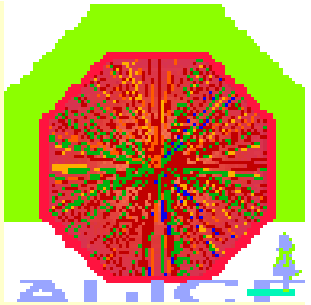

K^0_s reconstruction in ALICE

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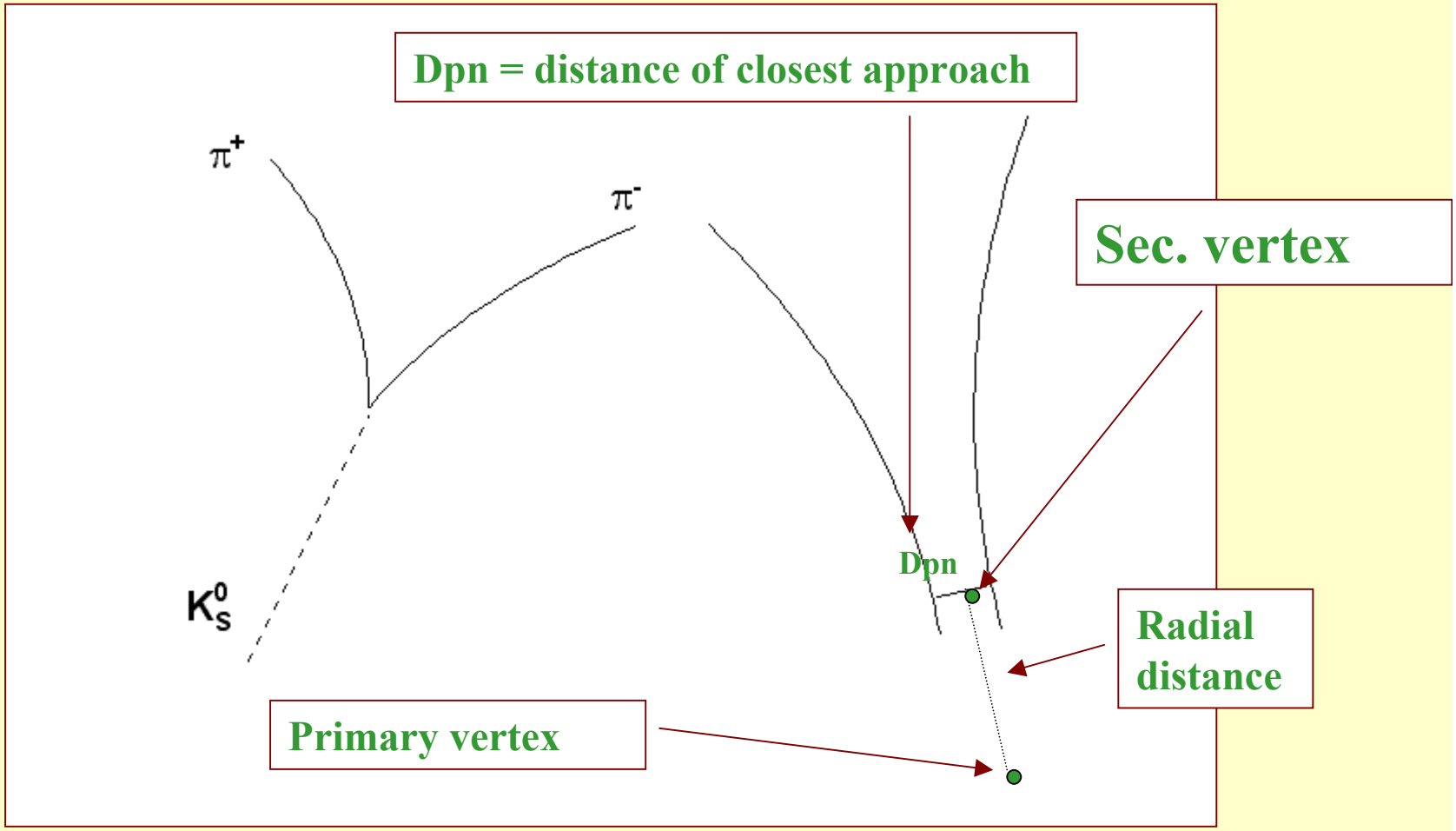
March 2002

Summary

- Introduction
- Simulation
- Optimization of cuts
- Results
- Conclusions

Introduction

V0 position = middle point between the two tracks at the distance of closest approach



Simulation

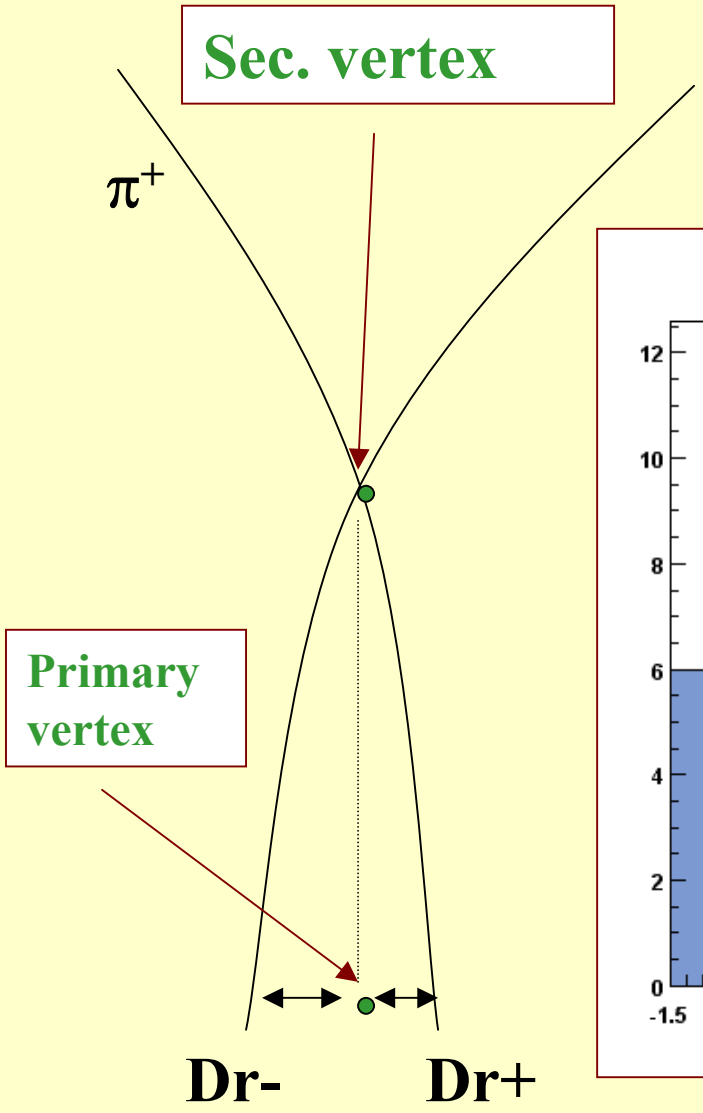
- **B = 0.2 T**
- **Aliroot v 3.06**
- **Event generator: HIJING (full)**
  - **generated 31 events with b = 3 fm**
- **"Slow" simulation of the ITS**
- **Tracking V1 in the ITS (with 6 points)**
  - **step 1: with vertex constraint**
  - **rejection of the "primary tracks"**
  - **step 2: without vertex constraint**
- **Straight line approximation from the beam pipe backwards to the primary vertex**
- **Combination of π^+ and π^- tracks and application of the cuts**
  - **search of K^0_S within a fiducial region (R=0.5-2.5 cm)**

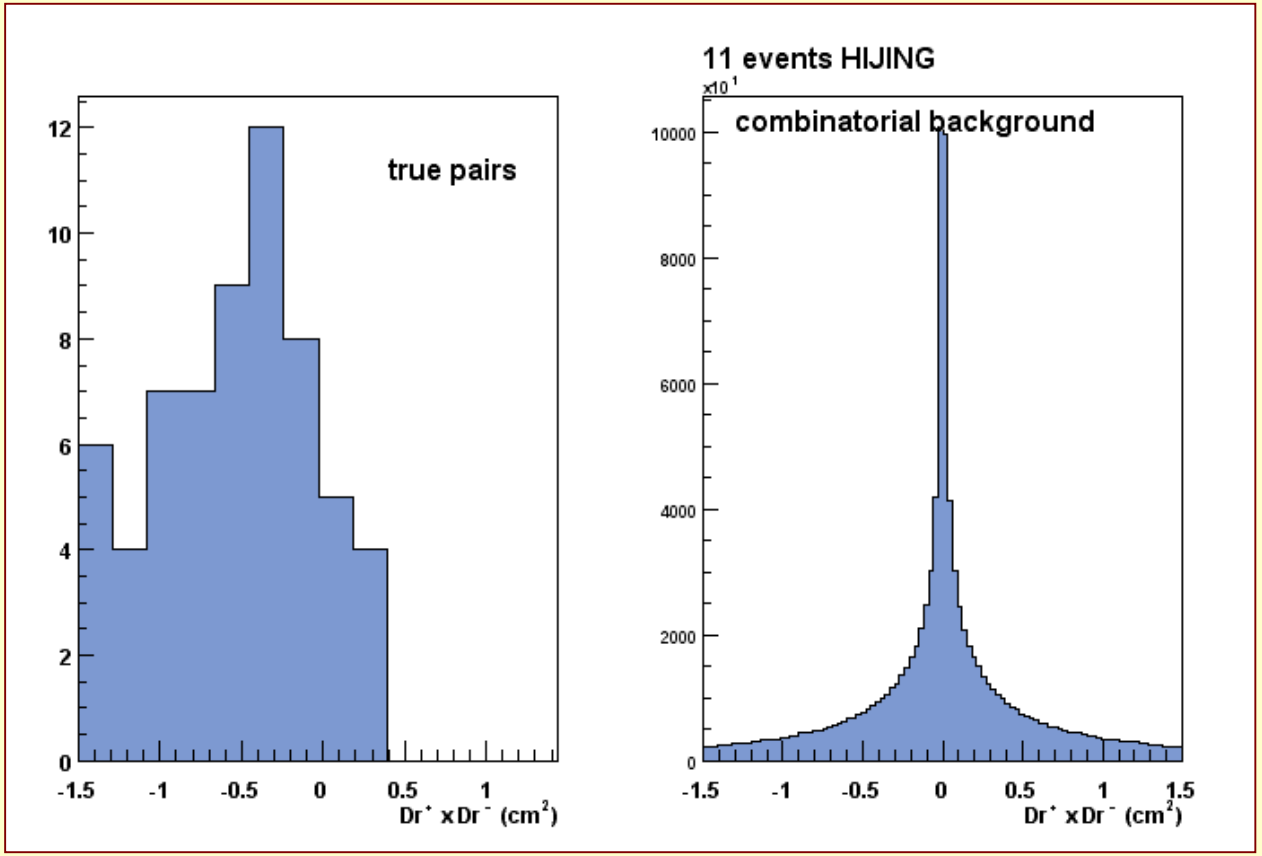
List of the cuts used

- **Cut 1: product of the radial impact parameter (Dr- * Dr+)**
- **Cut 2: distance of closest approach (Dpn)**
- **Cut 3: angle between the K^0_s position vector and the K^0_s momentum (β)**
- **Cut 4: impact parameter of the daughters (D)**
- **Cut 5: χ^2 of the daughters**

Cut 1: product of the radial impact parameter

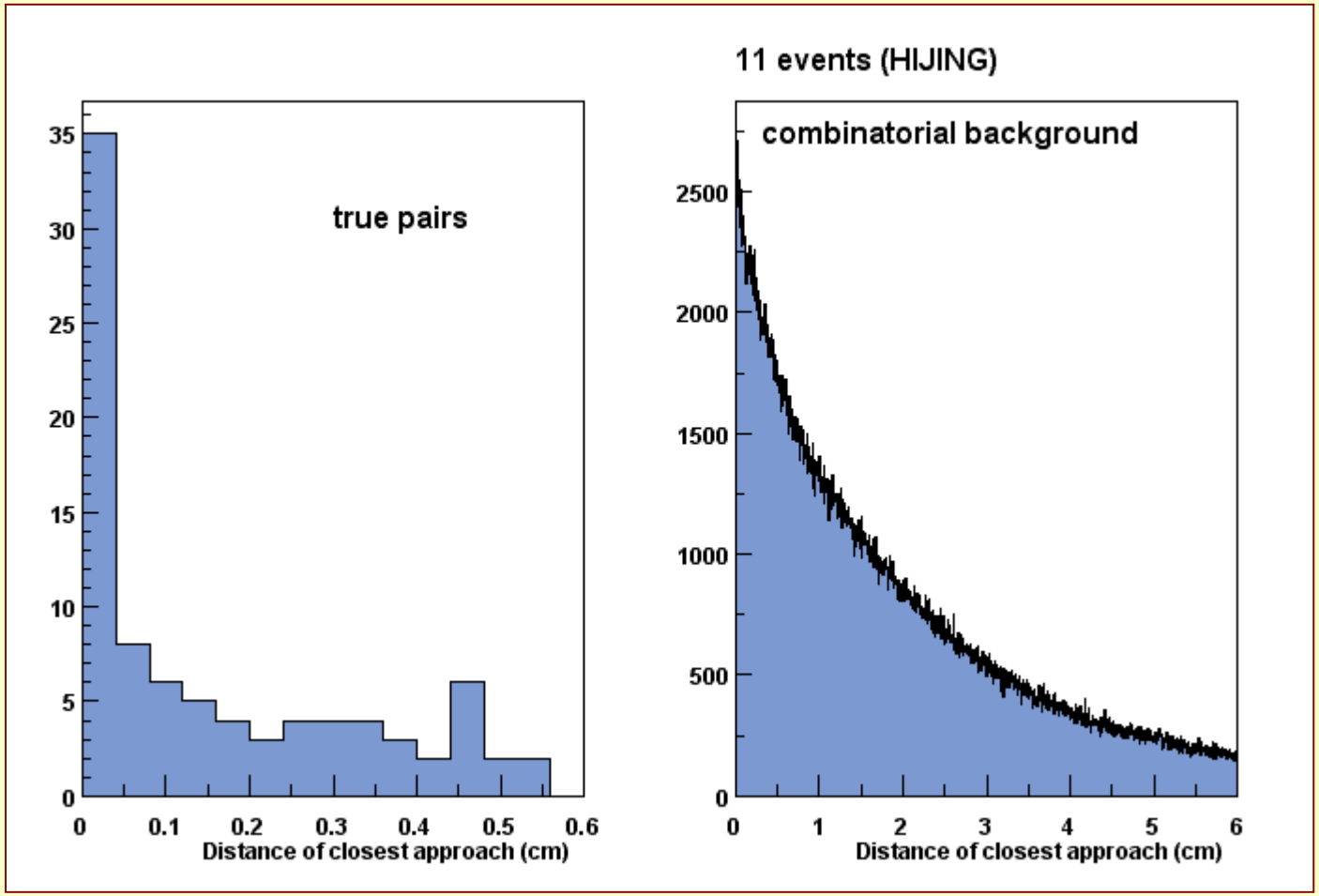
Dr- * Dr+ < 0



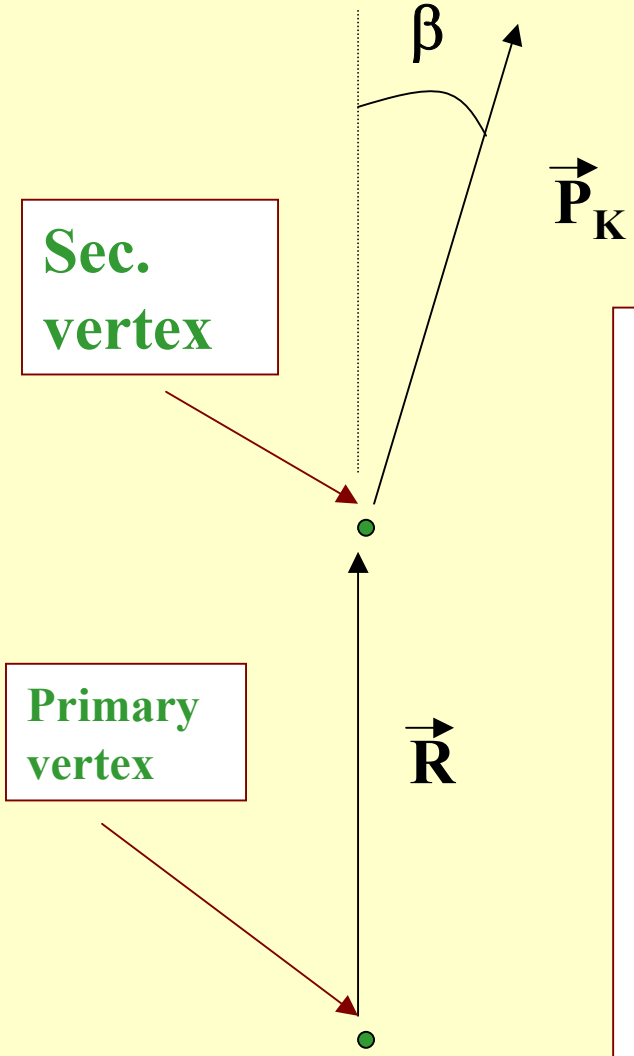


Cut 2: distance of closest approach (Dpn)

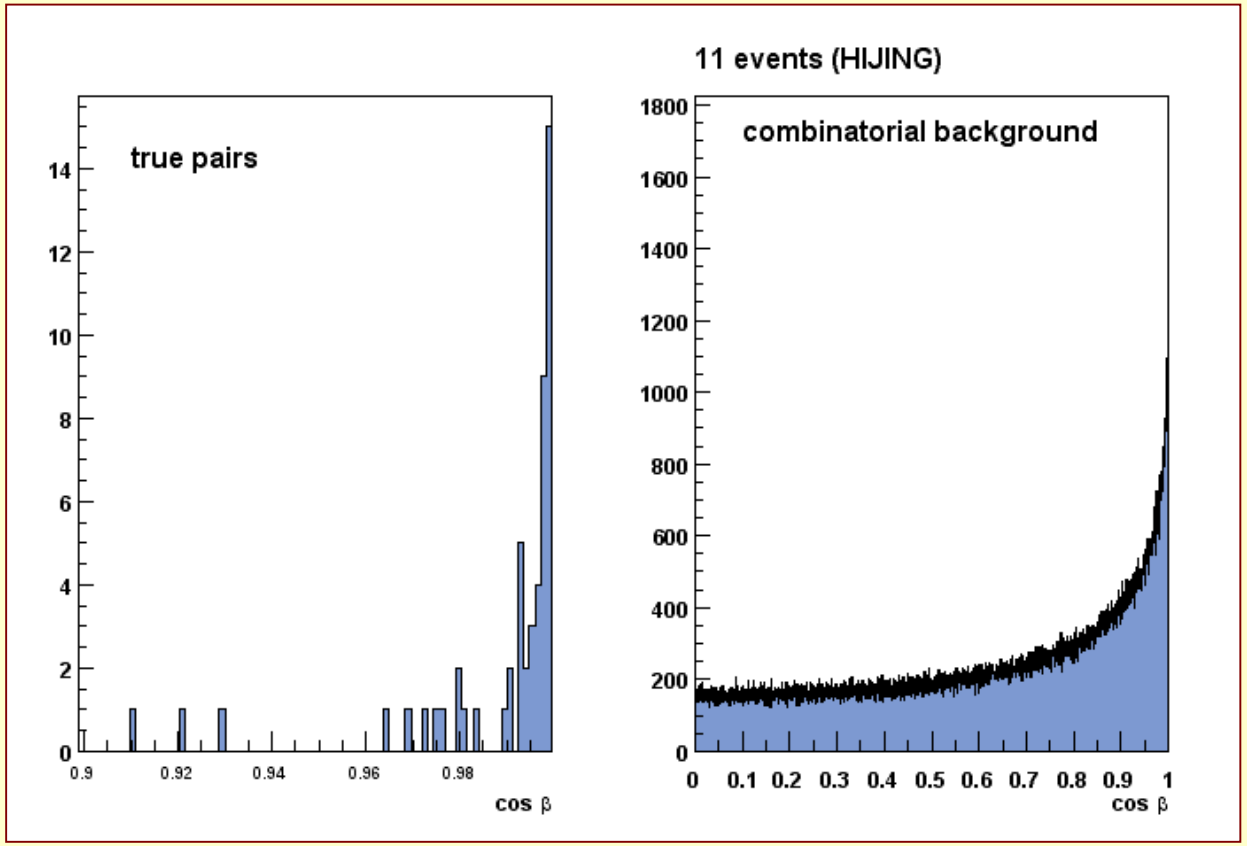
Dpn < 0.14 cm



Cut 3: angle between the K^0_s position vector ($\vec{R}$) and the K^0_s momentum ($\vec{P}_K$)



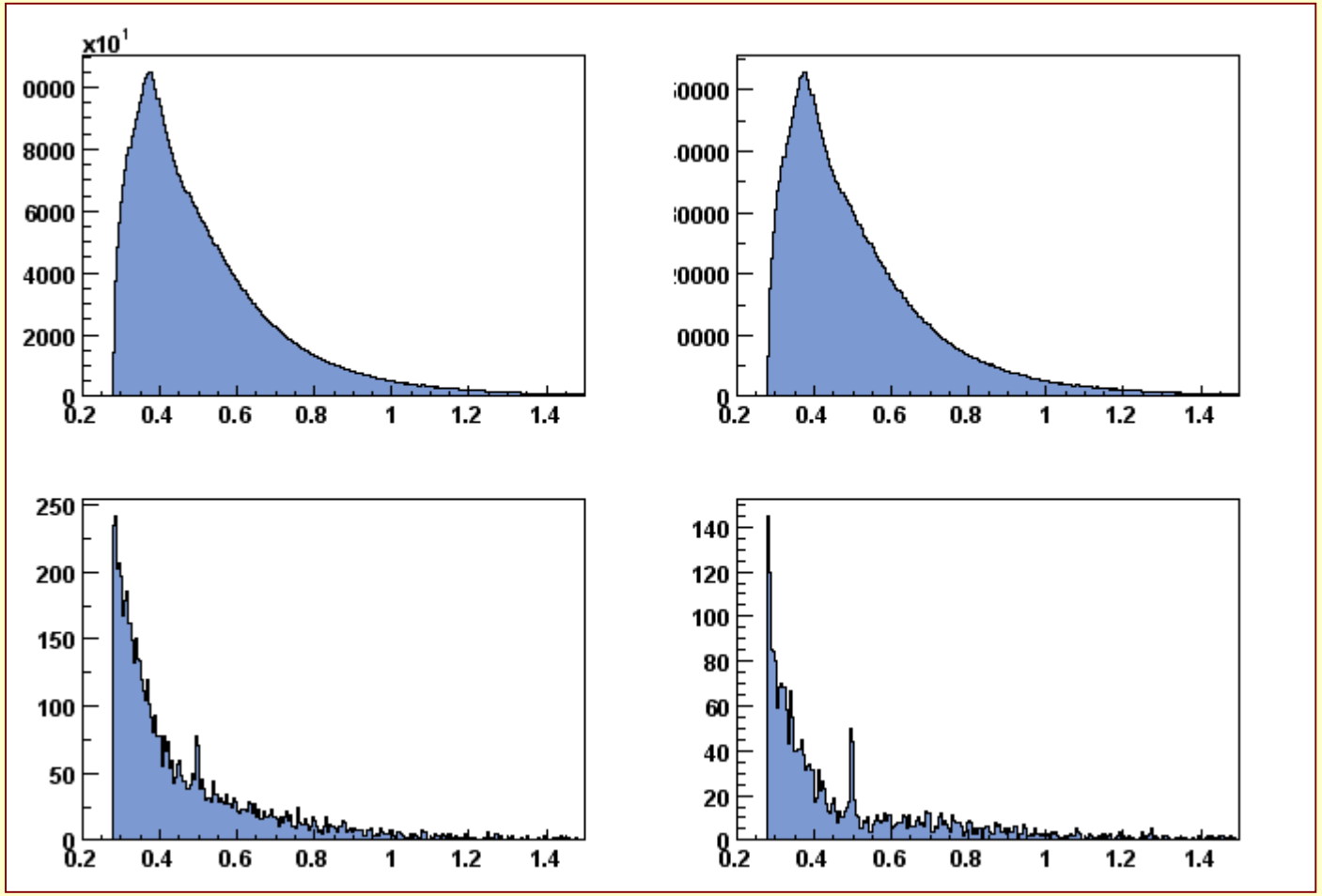
Cos β > 0.9985



Effect of cuts

Without any cut

Dr- * Dr+ < 0

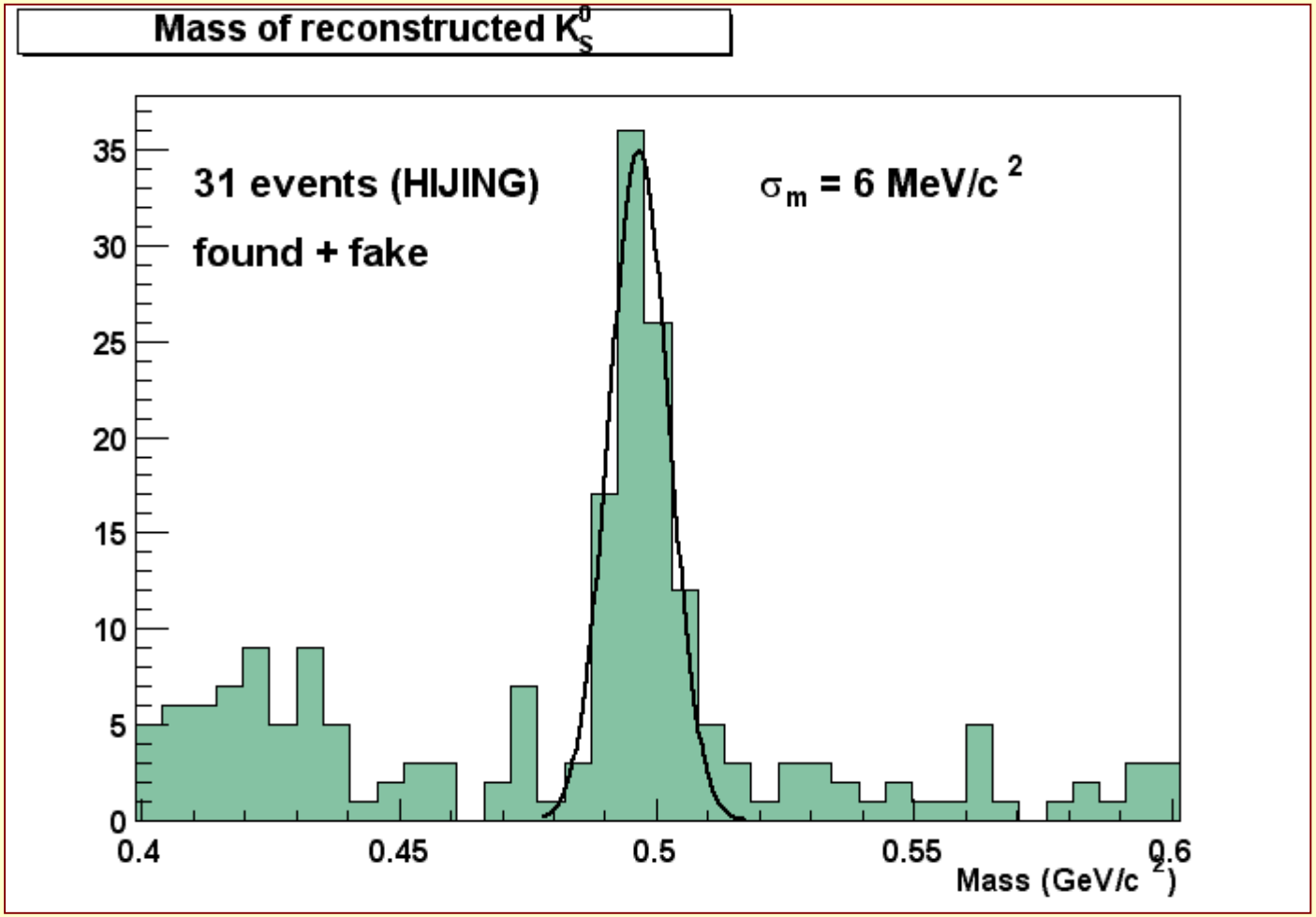


Cos β > 0.9985

Mass (GeV/c²)

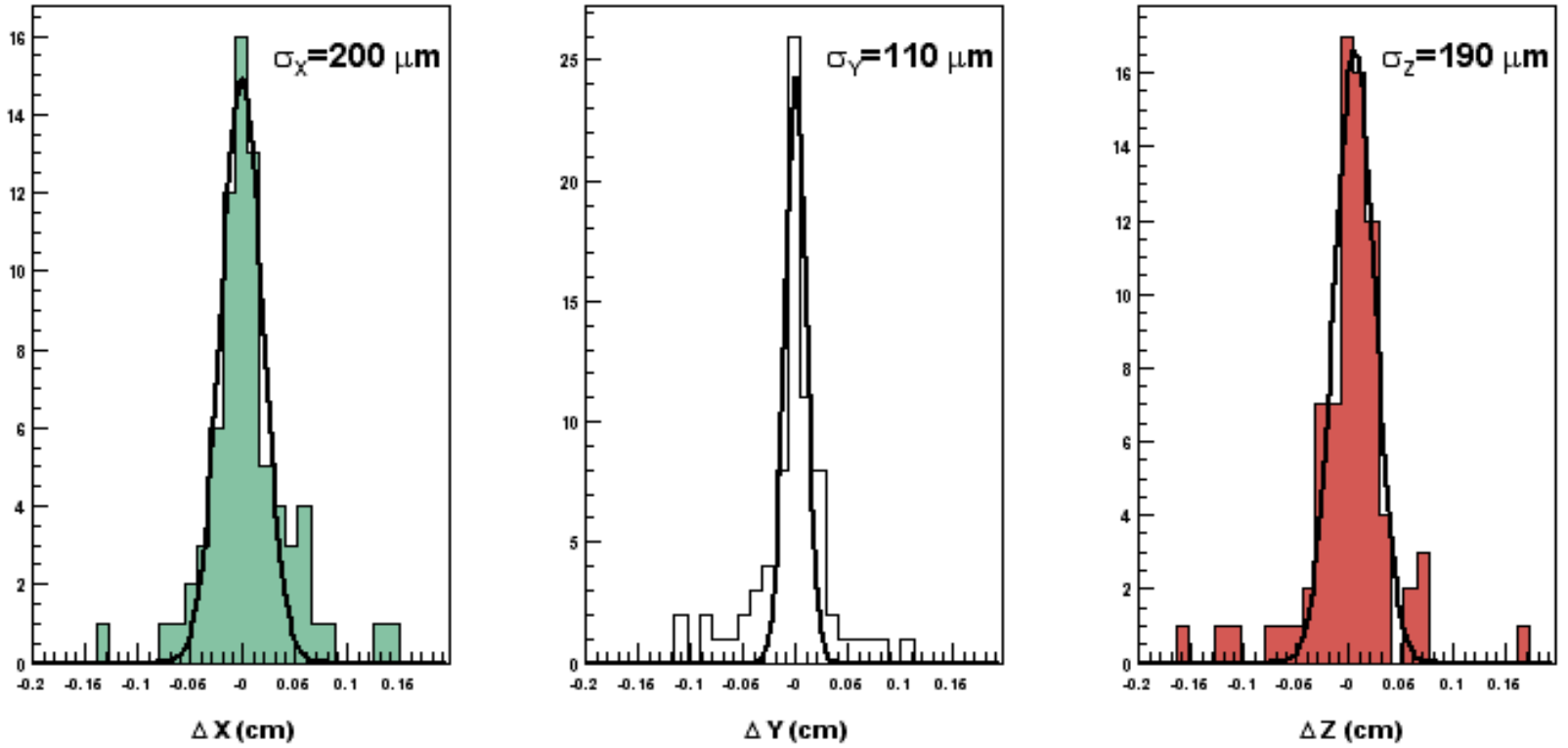
Dpn < 0.14 cm

Results



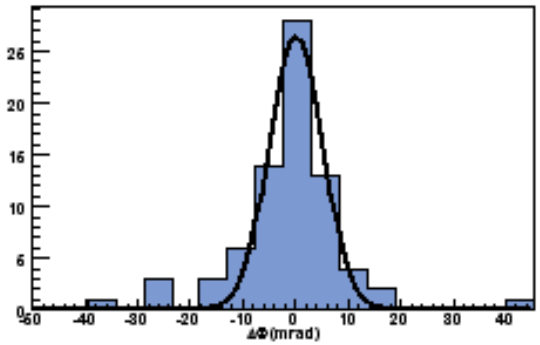
N. found K^0_S ≈ 2.5 per event

x, y and z resolution of secondary vertices

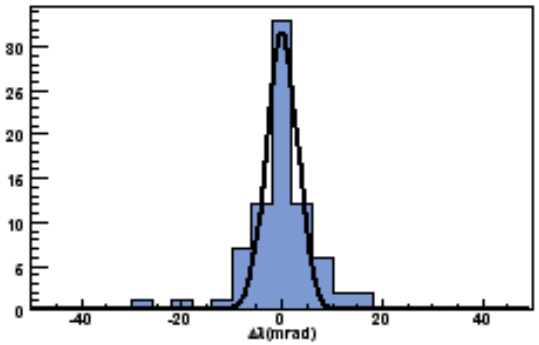


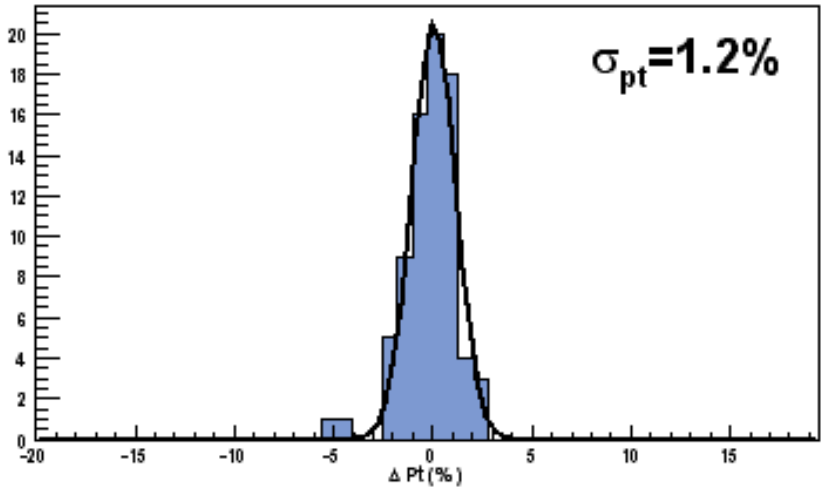
ϕ, λ and Pt resolution

$\sigma_{\Phi} = 5$ mrad



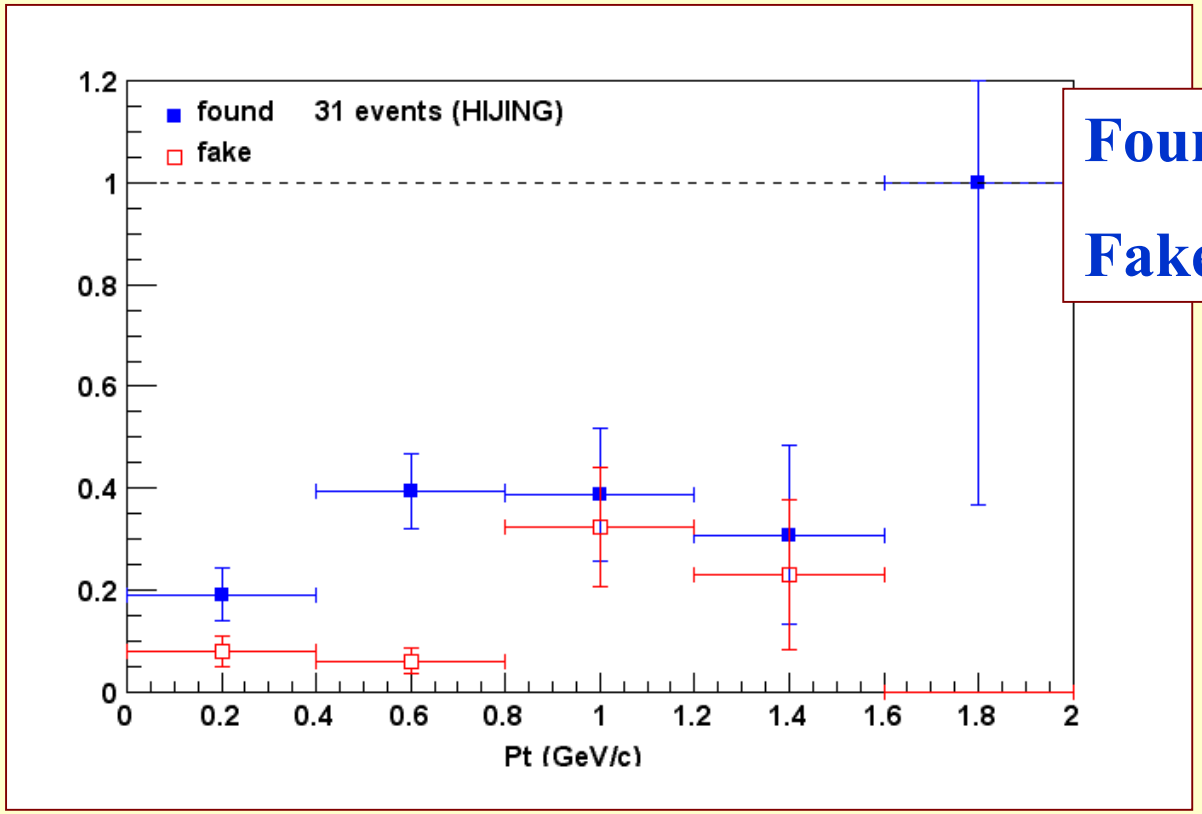
$\sigma_{\lambda} = 3$ mrad





Efficiency of algorithm and cuts

Eff = no. of found K^0_s / no. of findable K^0_s after the TPC-ITS tracking



Found Eff. = 32 %

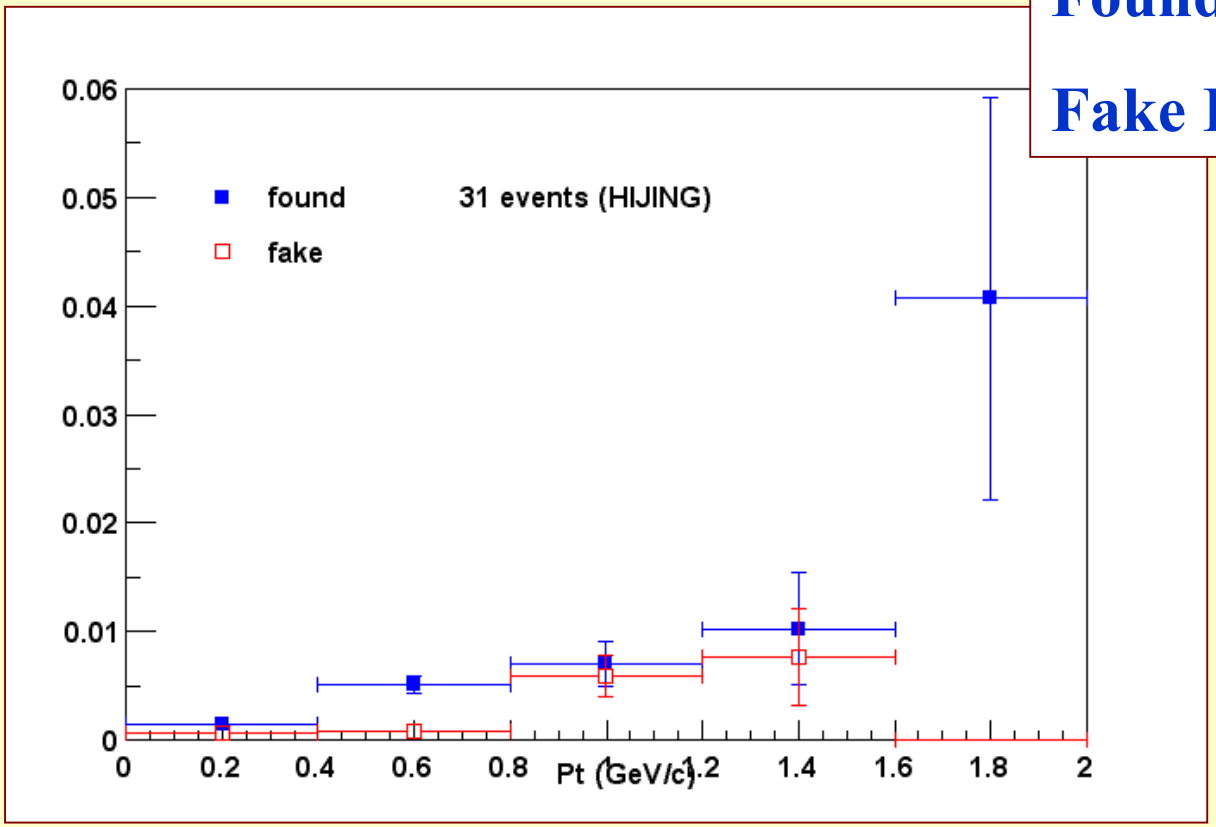
Fake Prob. = 11 %

Total found efficiency

Eff = no. of found K^0_s / no. of generated K^0_s

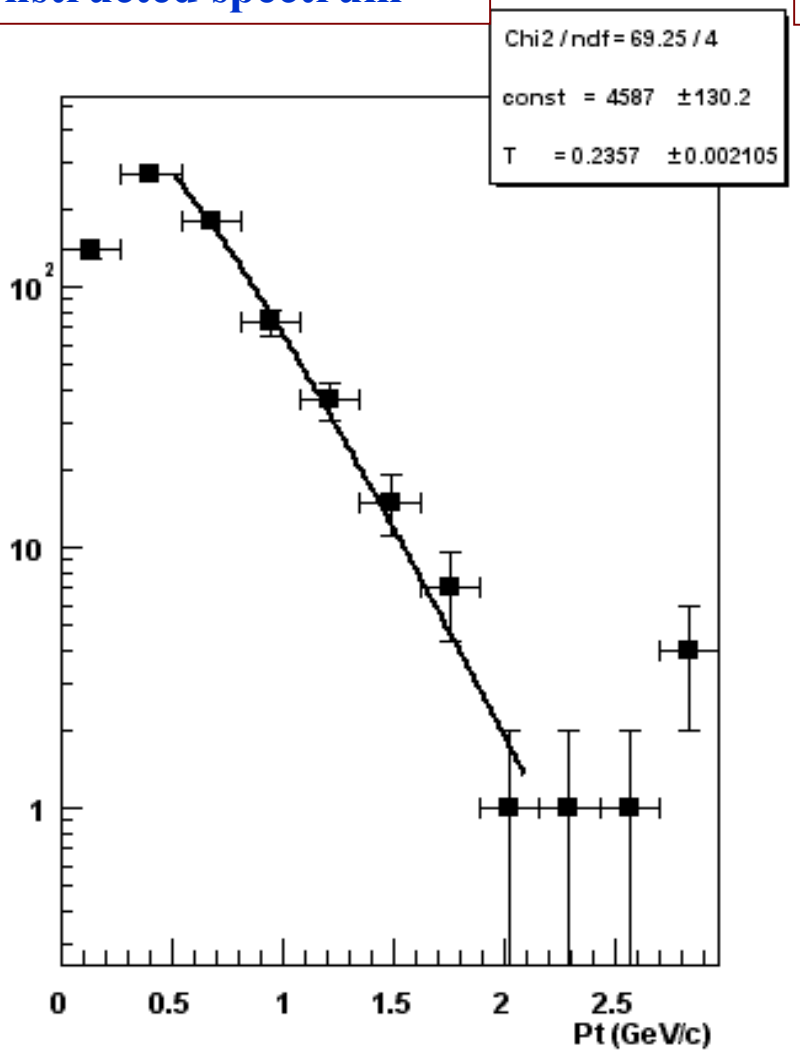
Found Eff. = 0.37 %

Fake Prob. = 0.12 %

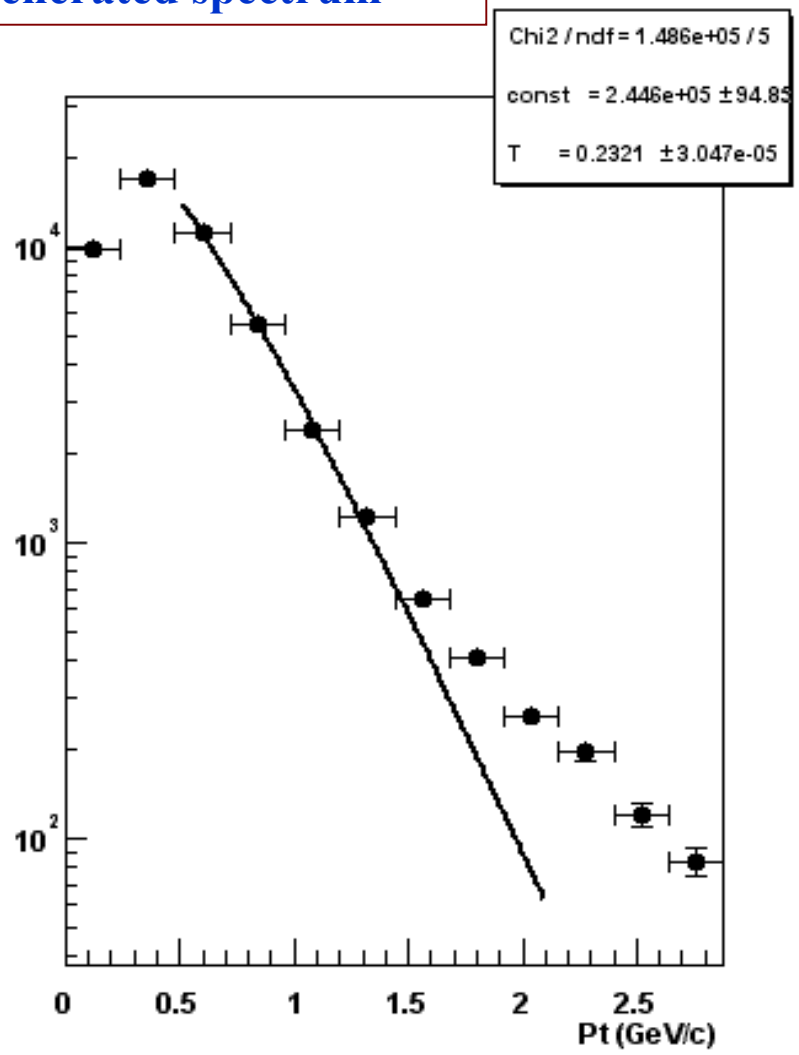


Reconstructed Pt spectrum

Reconstructed spectrum



Generated spectrum



Conclusions and future work

- **The problem of reconstructing K^0_S in ALICE is under investigation in a realistic simulation framework**
- **An algorithm for Aliroot has been written and its resolution and efficiency have been evaluated**
- **Evaluation of the effect of a different choice of the fiducial region**
- **Simulations with a magnetic field of 0.4 T**
- **Studies for reconstructing the Λs are already started**