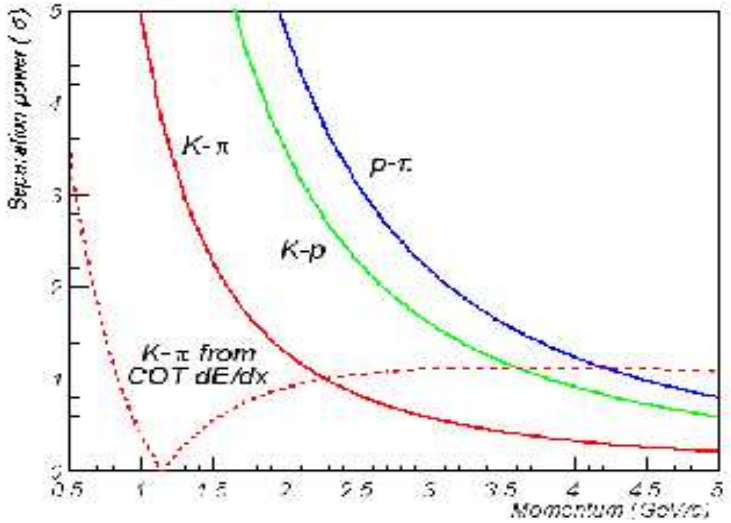
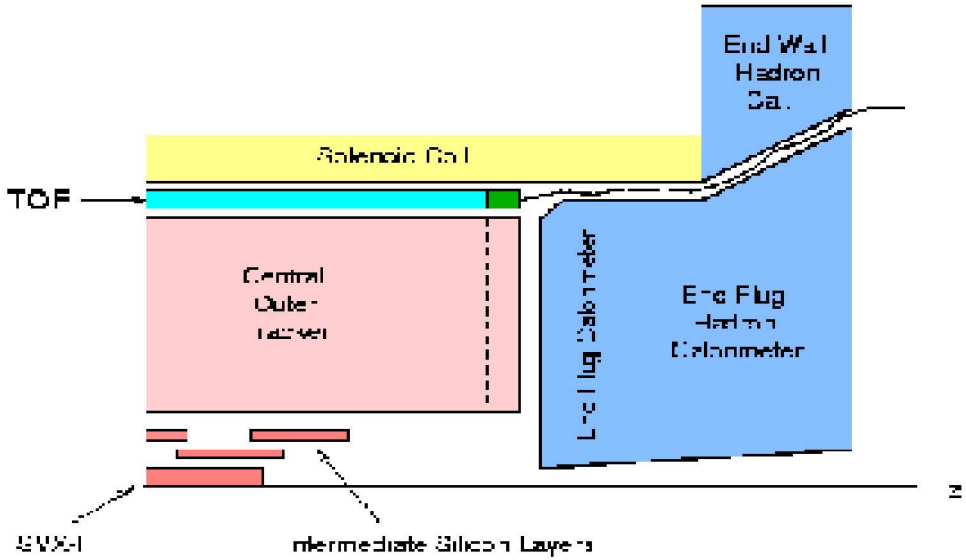
Particle Identification

1) TOF: scintillator bars
   216x2 PMT channels
   resolution: 100ps



2) COT wires:
   96 pulse height meas.
   dE/dx from pulse width



Goal on K/π separation:

moderate P_t: separation>1σ

TOF+dE/dx

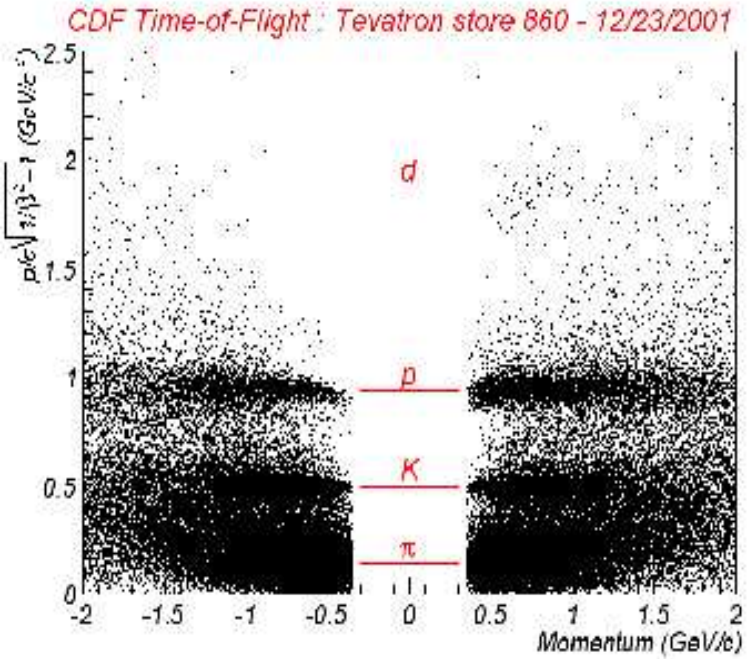
P_t<1.6: separation >2σ

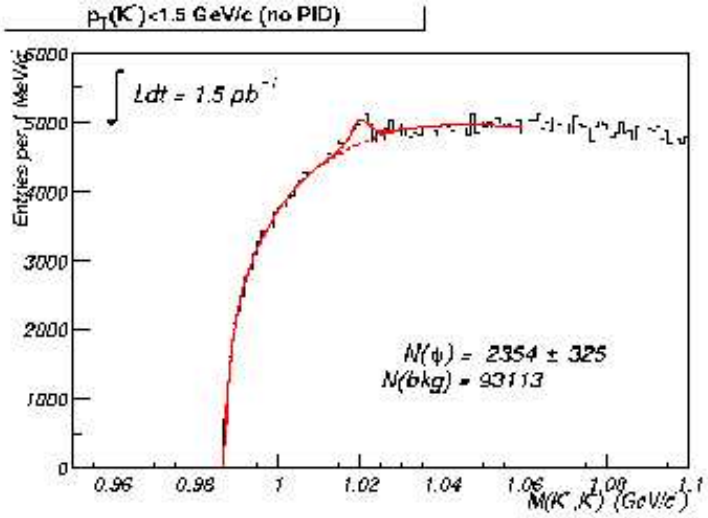
TOF

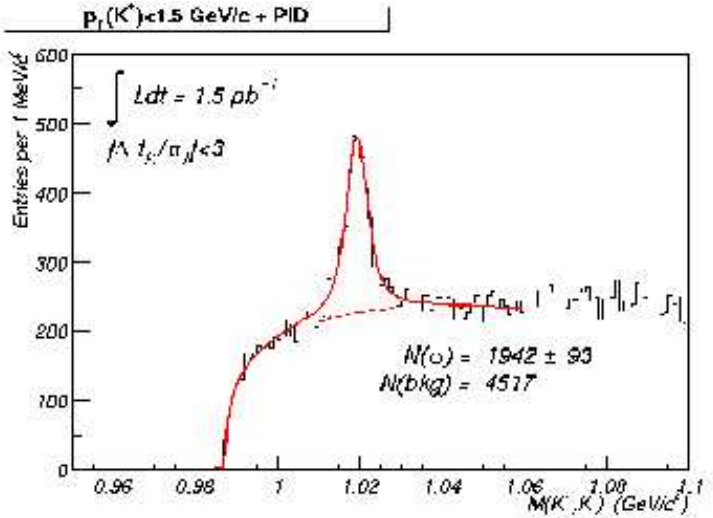
Particle Identification performance

dE/dx under calibration

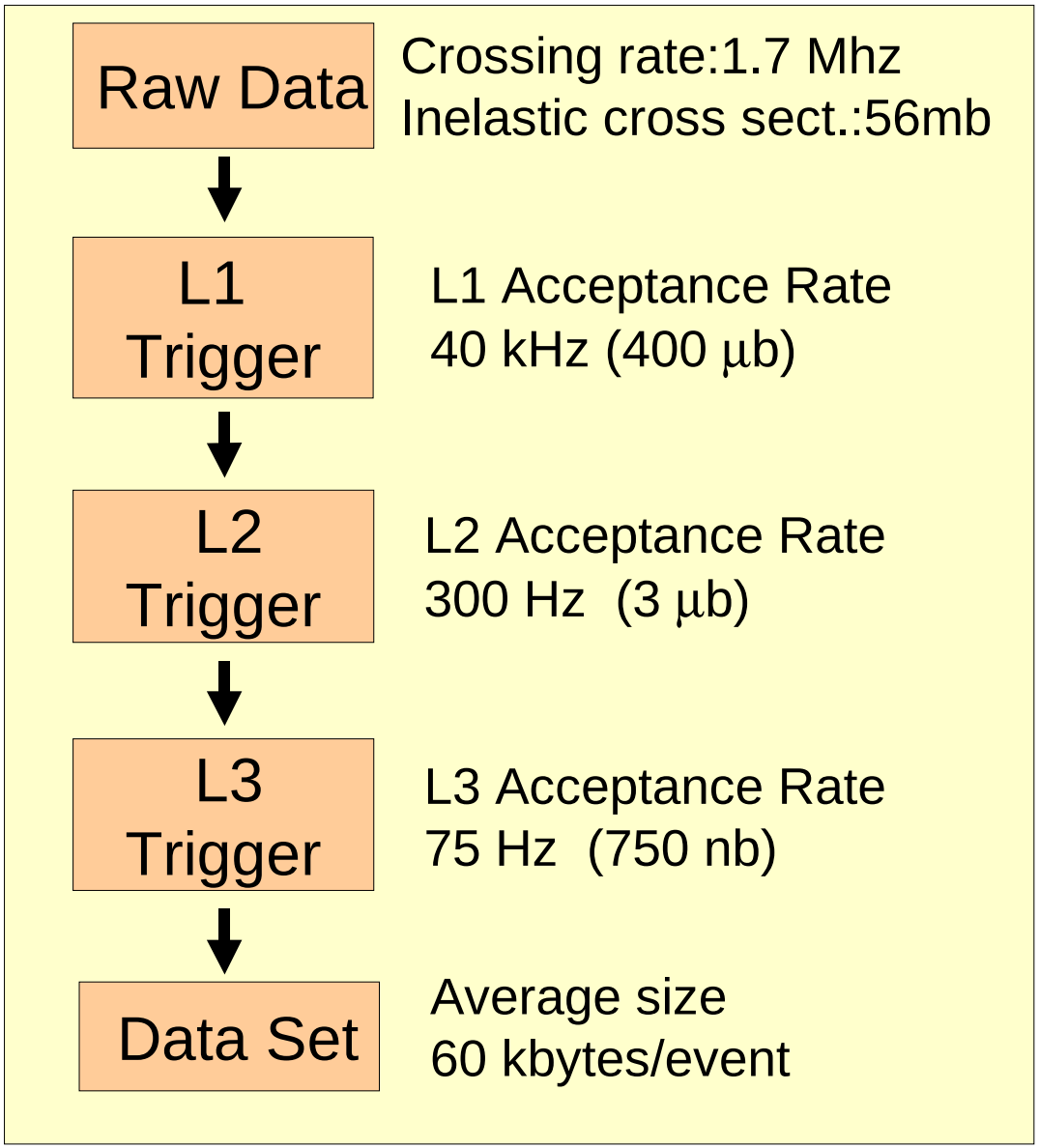
TOF results:







Trigger Overview



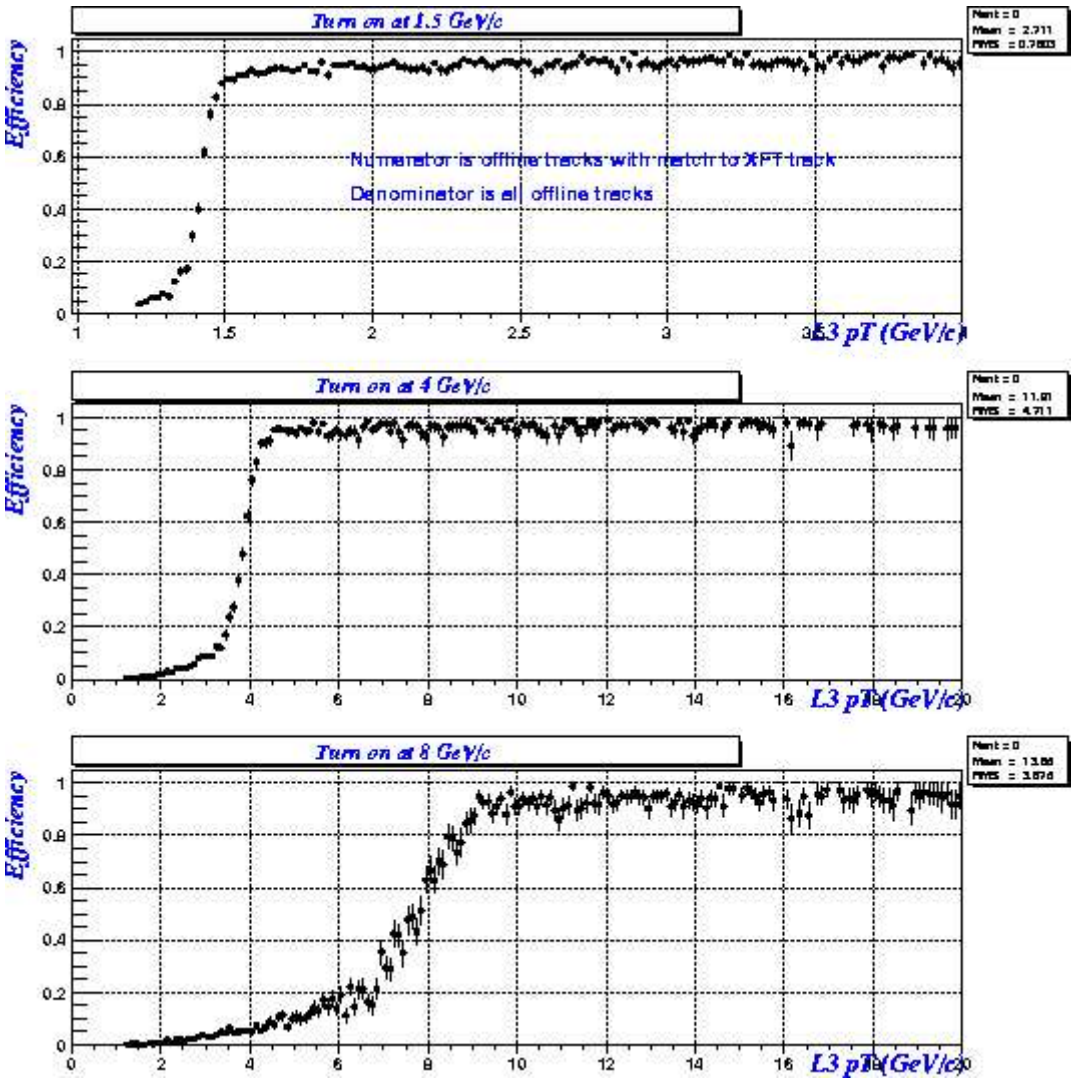
➔ Level 1:
- Calorimeter:
  - ✗ Object triggers: $E_{\text{single towers}}$>threshold
  - ✗ Global triggers: $\sum E_{\text{all towers}}$ >threshold
- eXtremly Fast Tracker
- Muons

➔ Level 2:
- Calorimeter Clustering
- Silicon Vertex Tracker

➔ Level 3:
- Offline−like

L1 track trigger: XFT

Use of COT axial hits (4 SL)
Finder: looks for segment in each SL
Linker:match 4 segments



Requirements:

2 Tracks P_t>2 GeV

opposite charge

$\Delta\Phi$<135

$P_t^1+P_t^2$>5.5 GeV

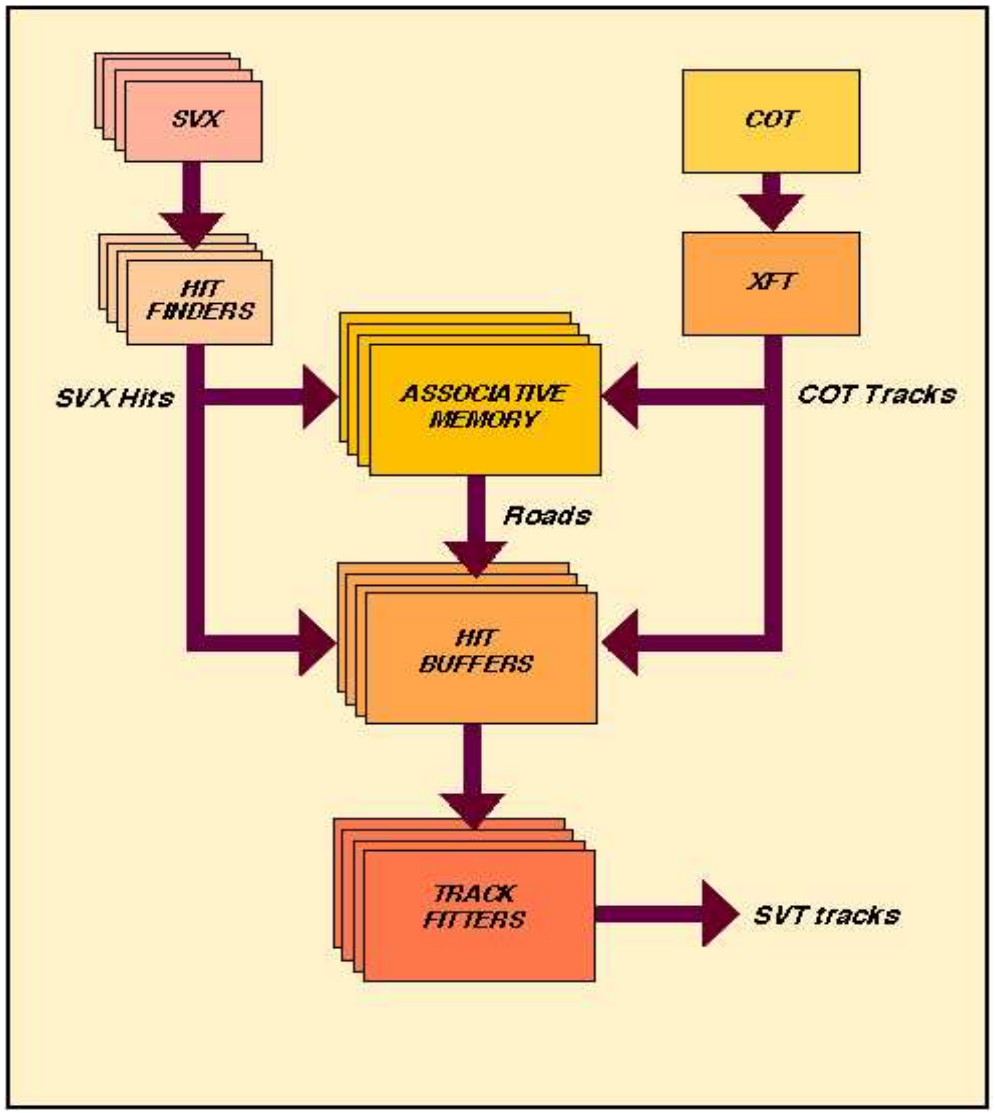
Performances:

$\delta P_t/P_t^2$=1.65% $(GeV)^{-1}$ (2)

$\delta\Phi$=5.1 mrad (8)

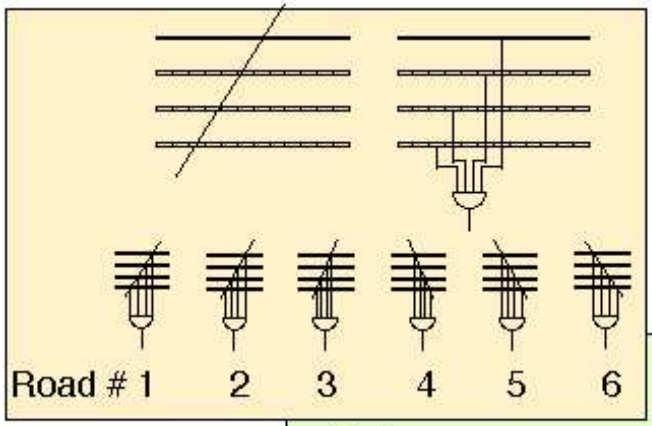
L2 track trigger: SVT

SVT architecture



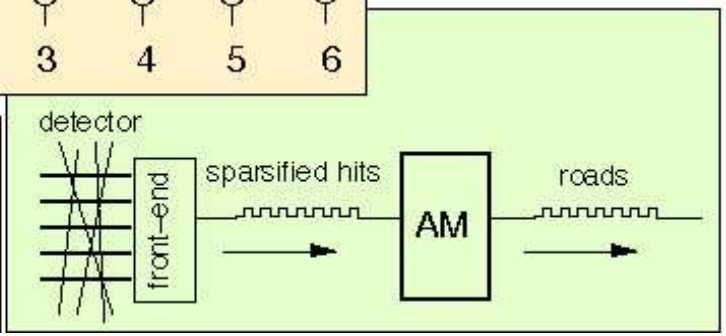
ASSOCIATIVE MEMORY WORKING PRINCIPLE

A set of roads is stored in the Associative Memory. Each road is stored at a different address and defines a possible track as the coincidence of one detector element per layer.



The front–end removes empty channels and generates a stream of hit coordinates. Hit coordinates are fed into the AM where each coordinate is compared with all the roads in parallel.

Immediately after the readout is finished, all the roads found by the AM are output sequentially as a stream of addresses.



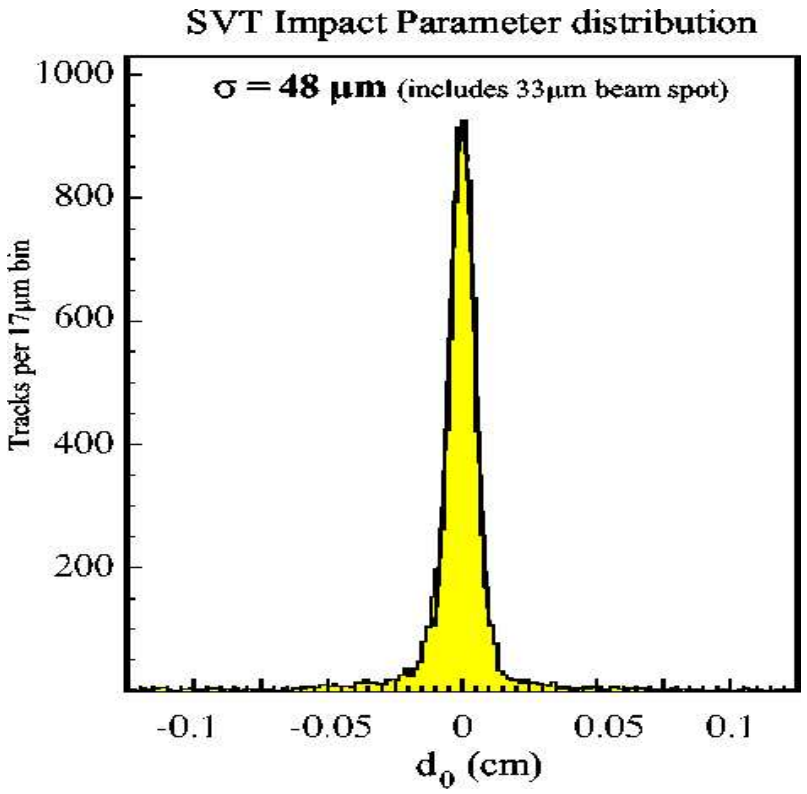
L2 Track Trigger:SVT Performances

Requirements:

2 Tracks P_t>2 GeV

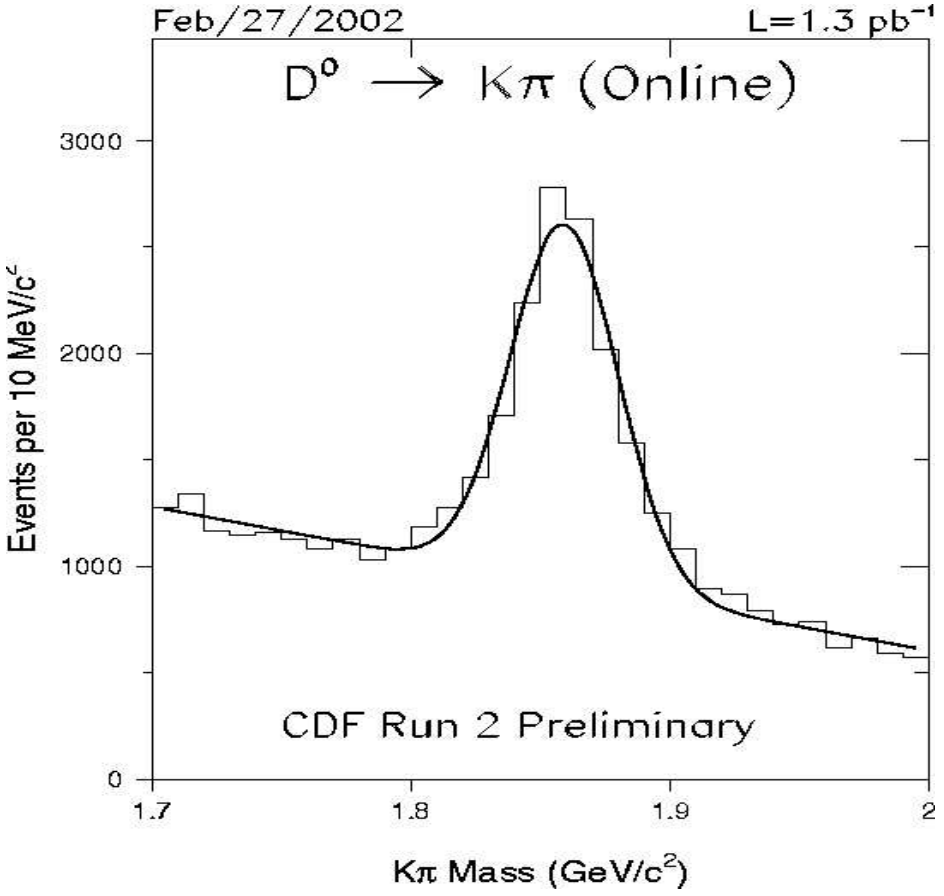
100 μm <|d|<1 mm

2<ΔΦ<135



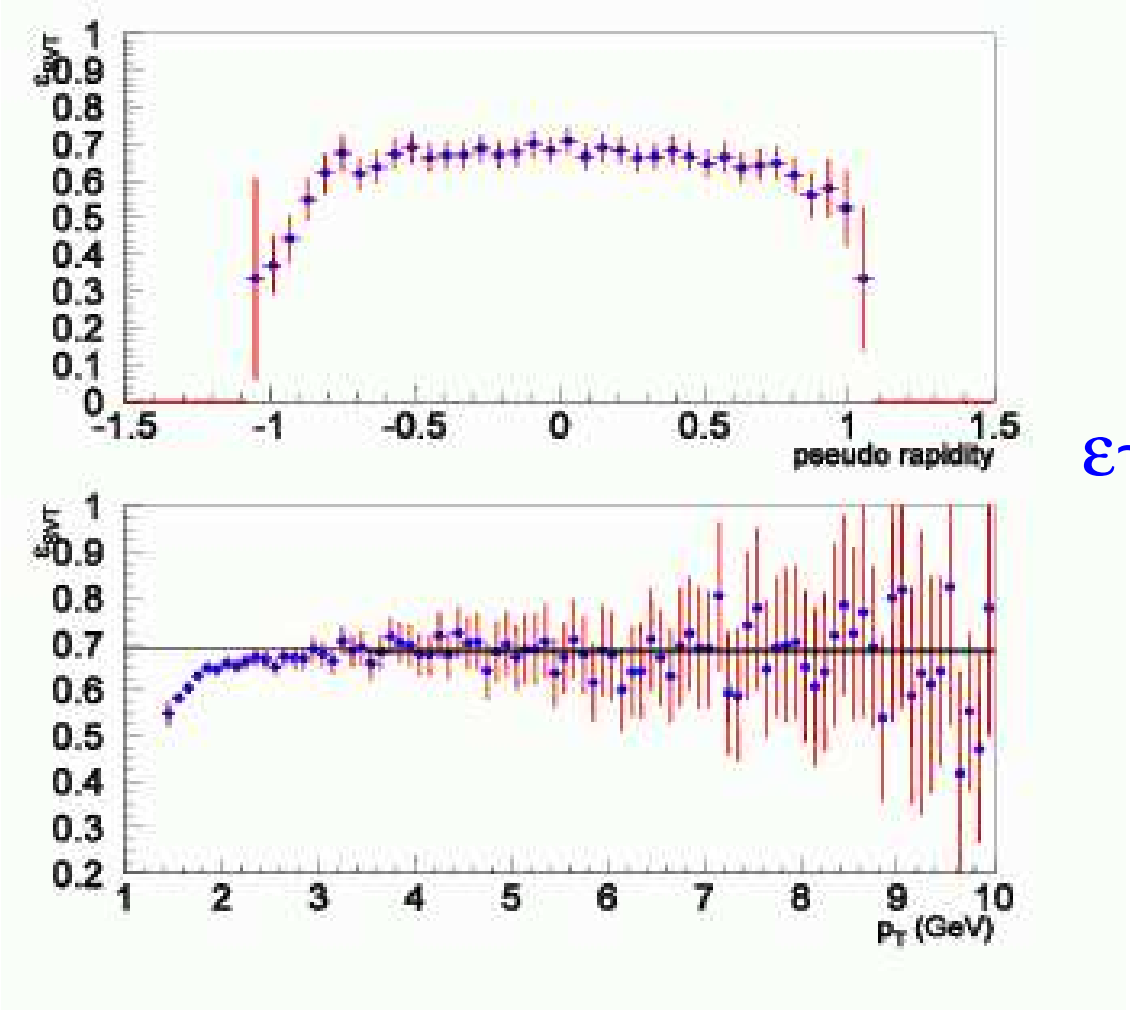
~8 events every nb^{-1}

D^0 peak: trigger monitor



L2 track trigger: SVT Efficiency

SVT tracking efficiency measured with data: J/ψ→μμ



ε~70%

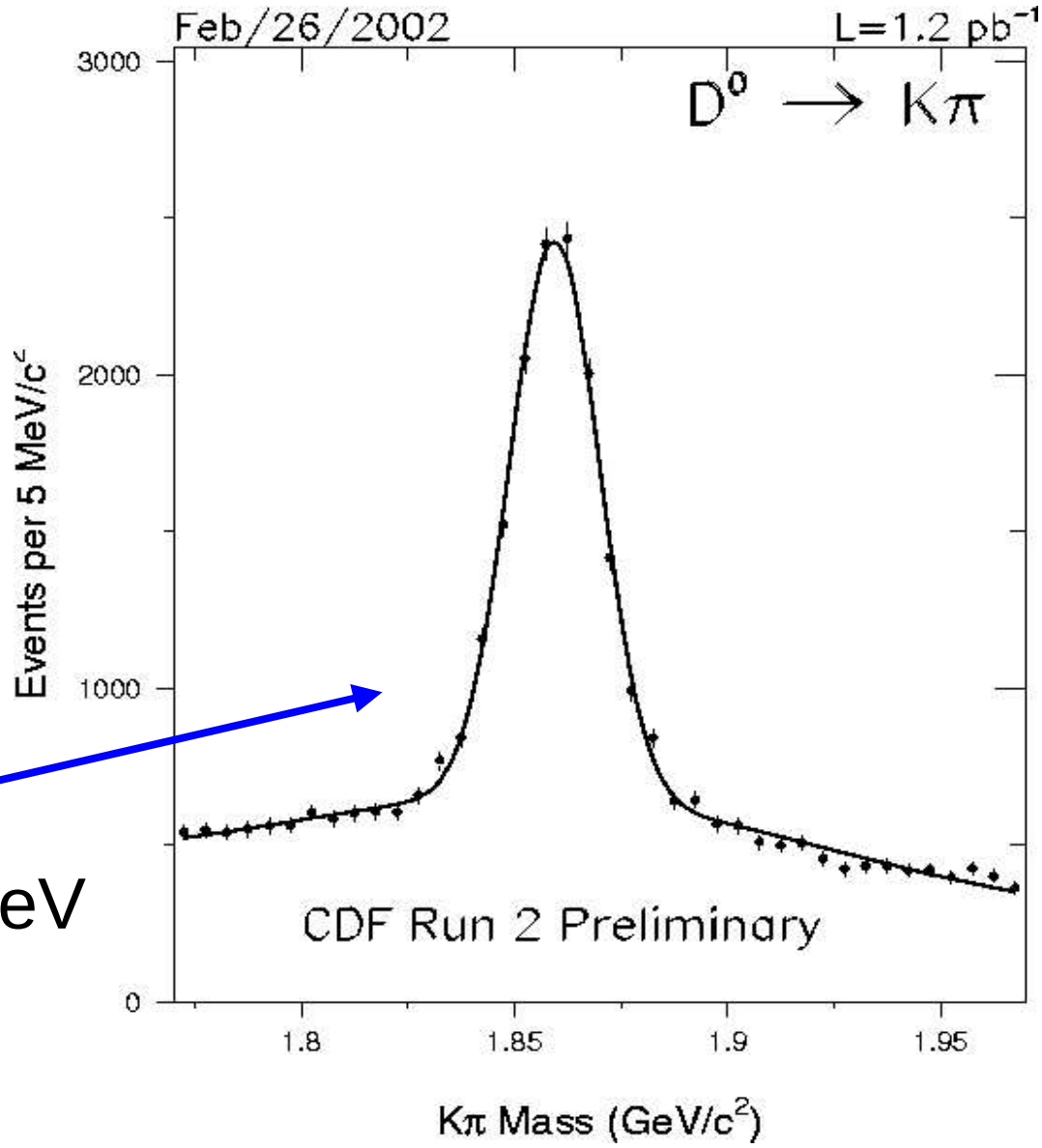
Charm reconstruction: Two bodies

D^0 reconstruction cuts:

- ✔ Pt>1.5 GeV
- ✔ |d|>100 μm
- ✔ COT hits≥20(ax.) & 20(st.)
- ✔ SVX hits≥3 (only axial)
- ✔ Δz<5 cm
- ✔ Lxy>0
- ✔ ΔR<2 $\Delta R=\sqrt{\Delta\eta^2+\Delta\varphi^2}$

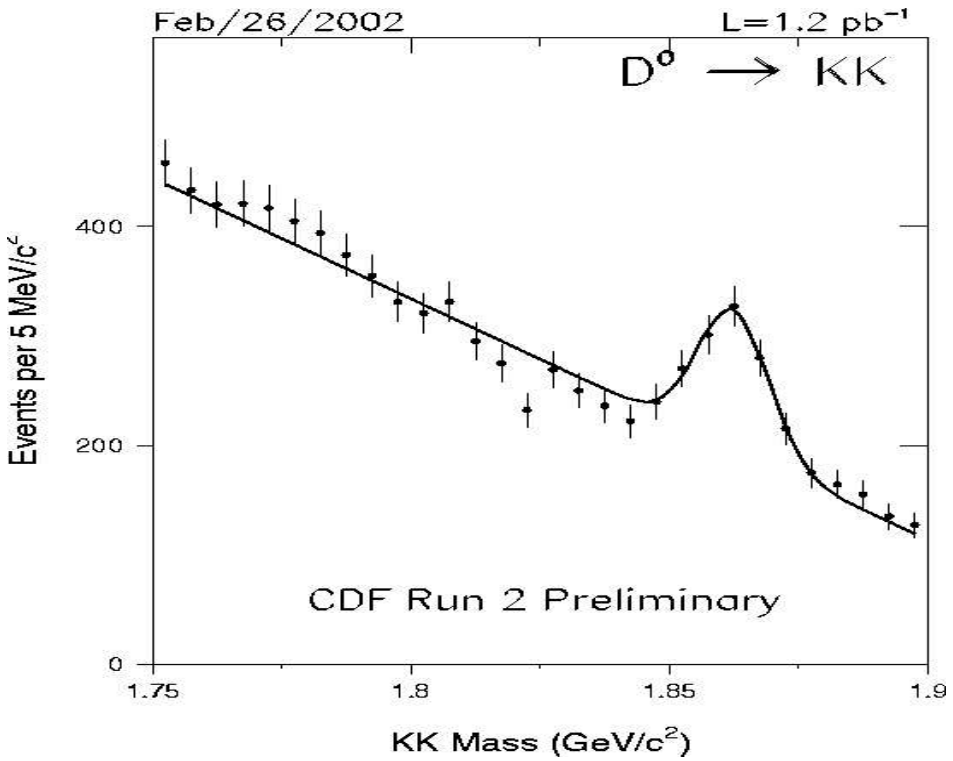
S/N>3

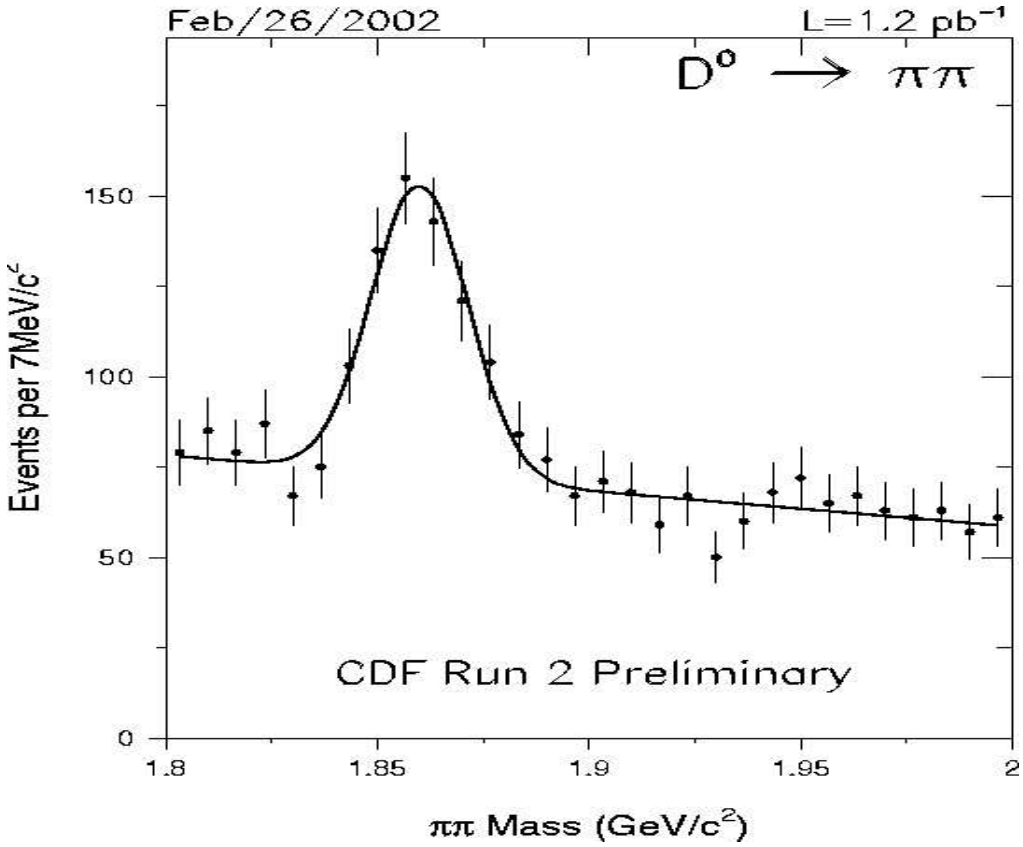
Mass resolution:~10 MeV



Charm reconstruction: Two bodies

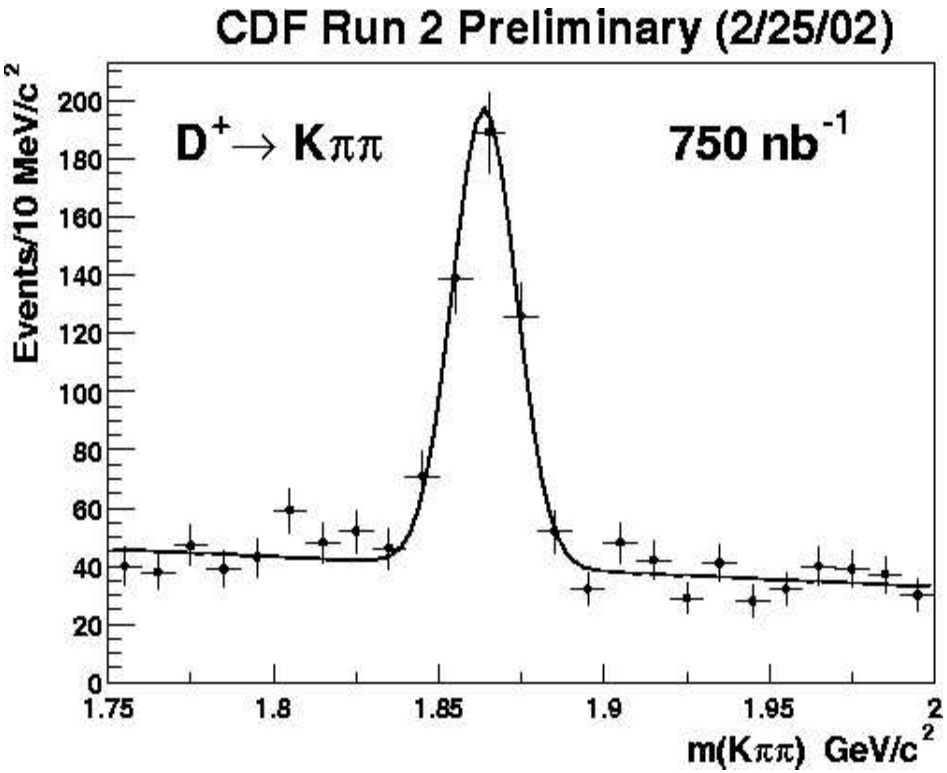
Same cuts as before





Charm reconstruction: Three prongs

Two tracks: same D^0 cuts
3rd track: loose cuts
$\Delta R<1$



Almost D^0 standard reconstruction
opposite−charge K and bachelor π