Border Effect in the TOF Reconstructioner

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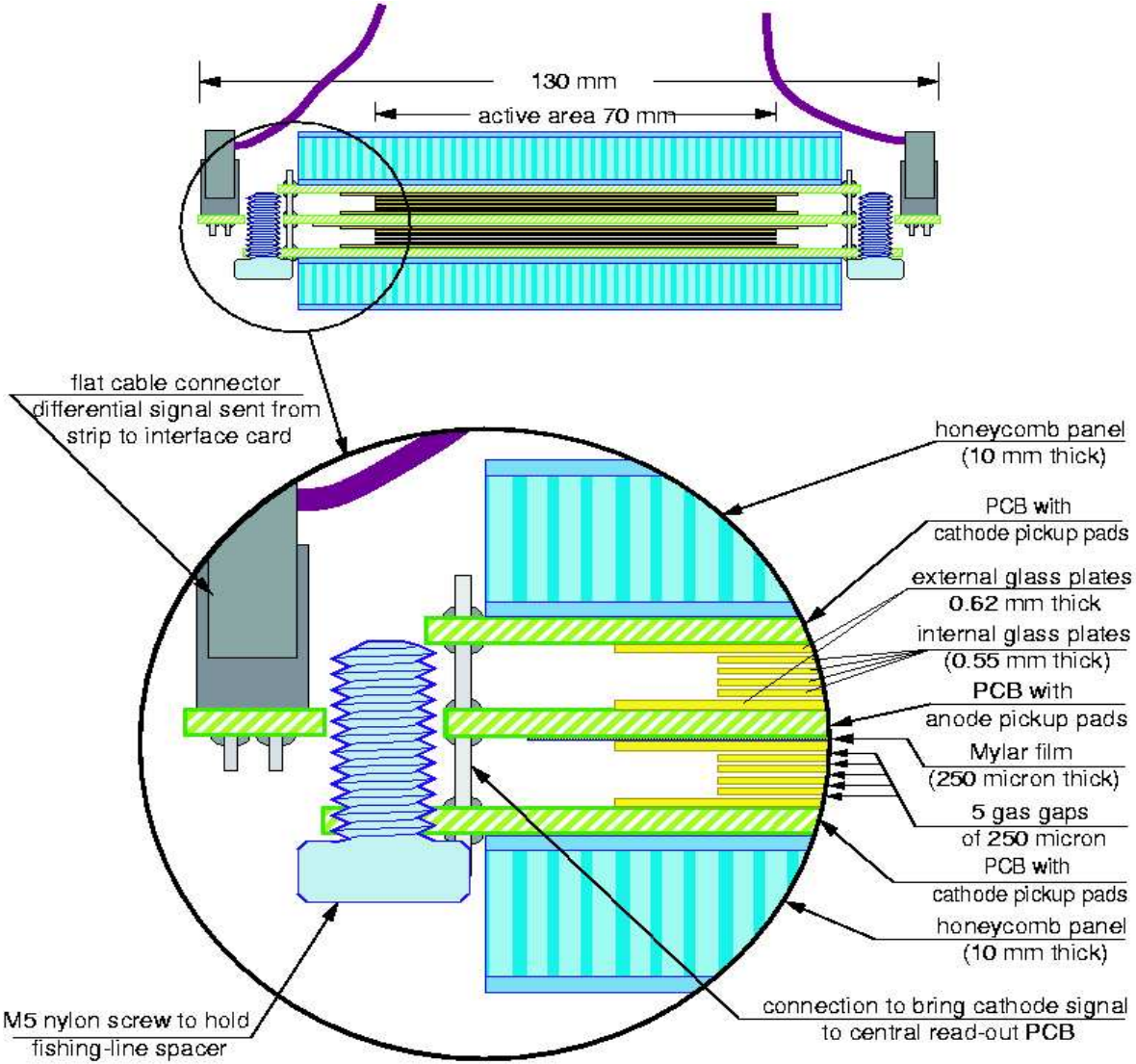
Double stack

Implemented in the TOF simulation code



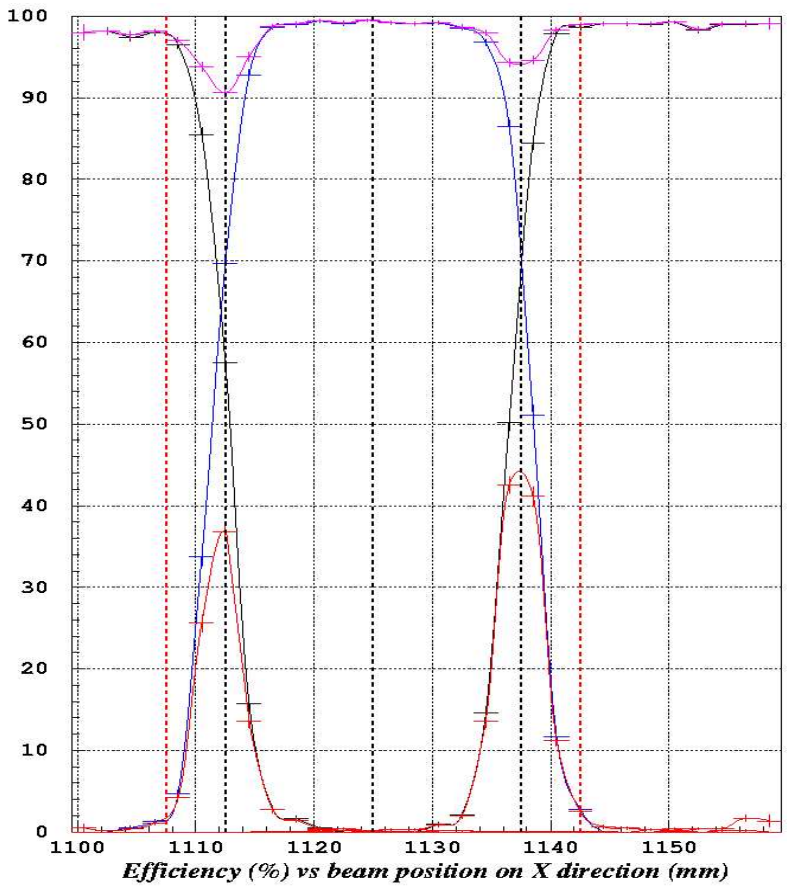
Efficiency

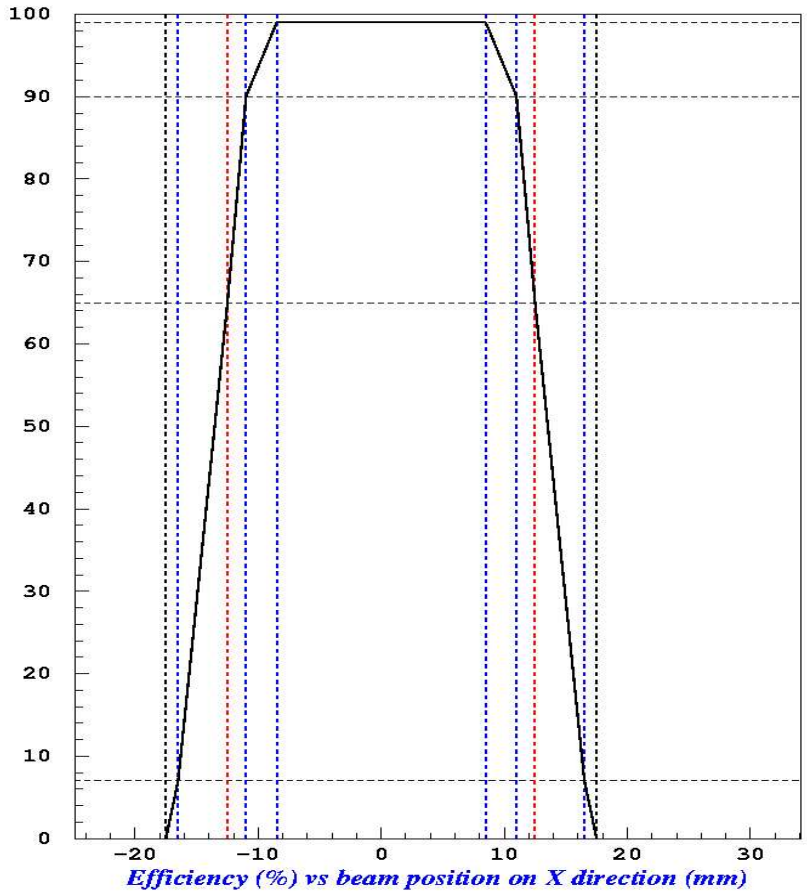
99 % on the **53** % of the pad area

99 % ⟶ **65** % on the **47** % of the pad area

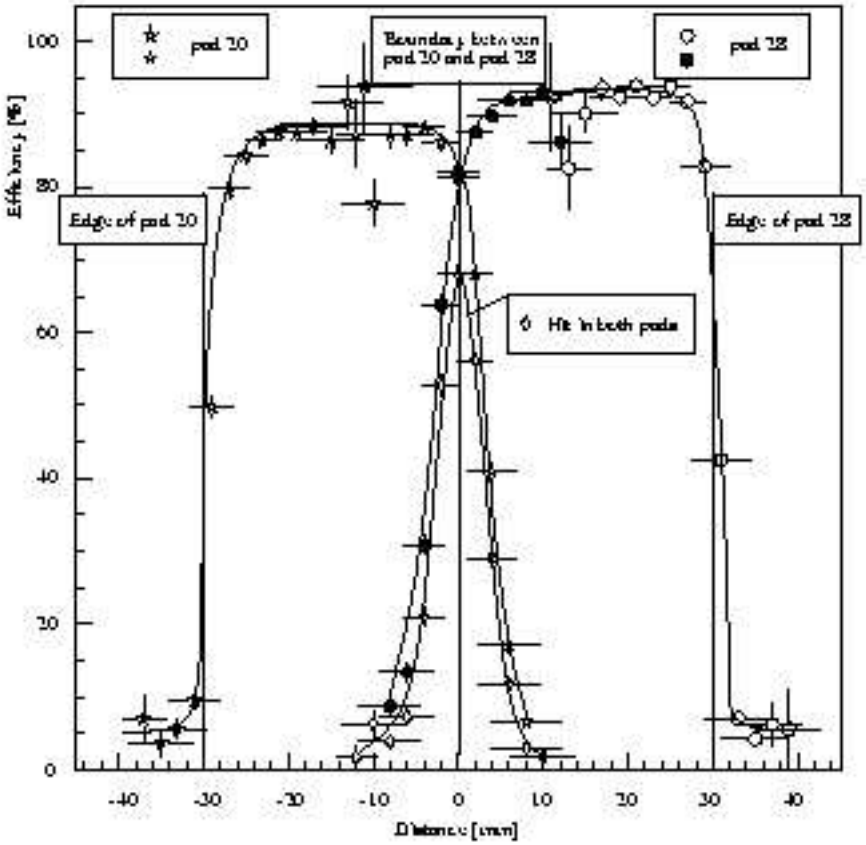
Border region: ± **5** mm (in the past, it was ± **10** mm)

Double hit probability: 12 % (before it was **30÷40** %)





Efficiency (2)



Efficiency as a function of position. The solid lines are to guide the eye.

Occupancy

(Physics + Background) occupancy decreased by

30 %

Past

10 %
(i.e. Neglible)

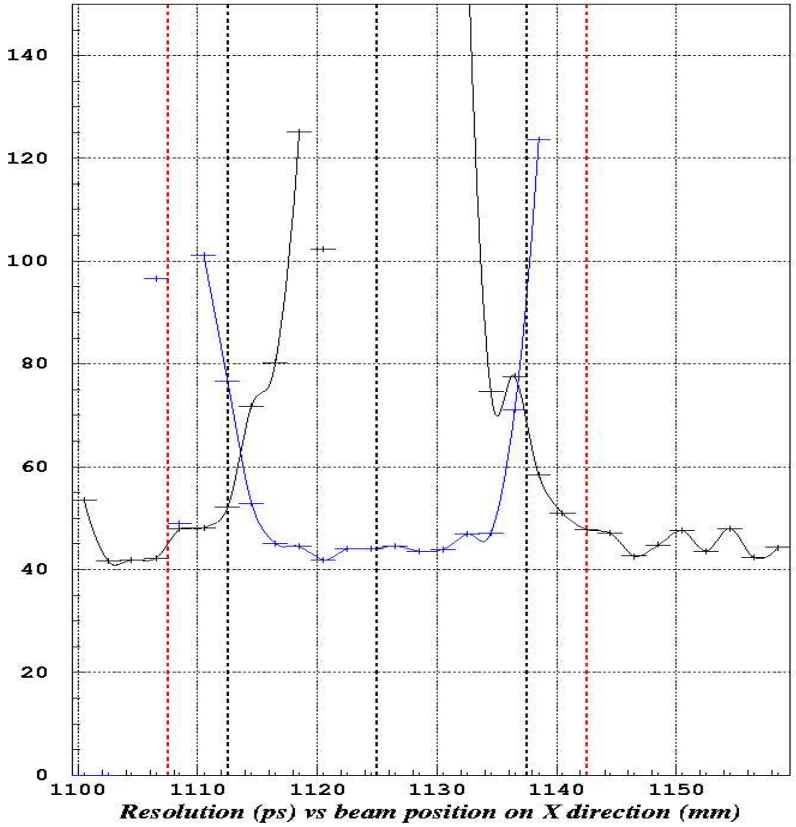
Present

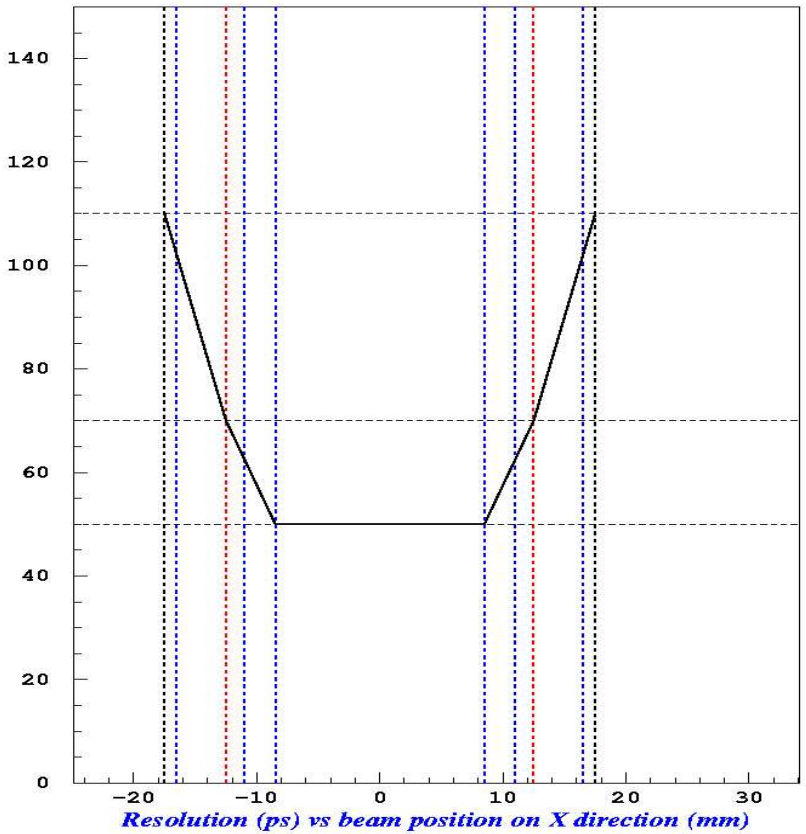
Time Resolution

Intrinsic time resolution curve:

50 *ps* on the **53** *%* of the pad area

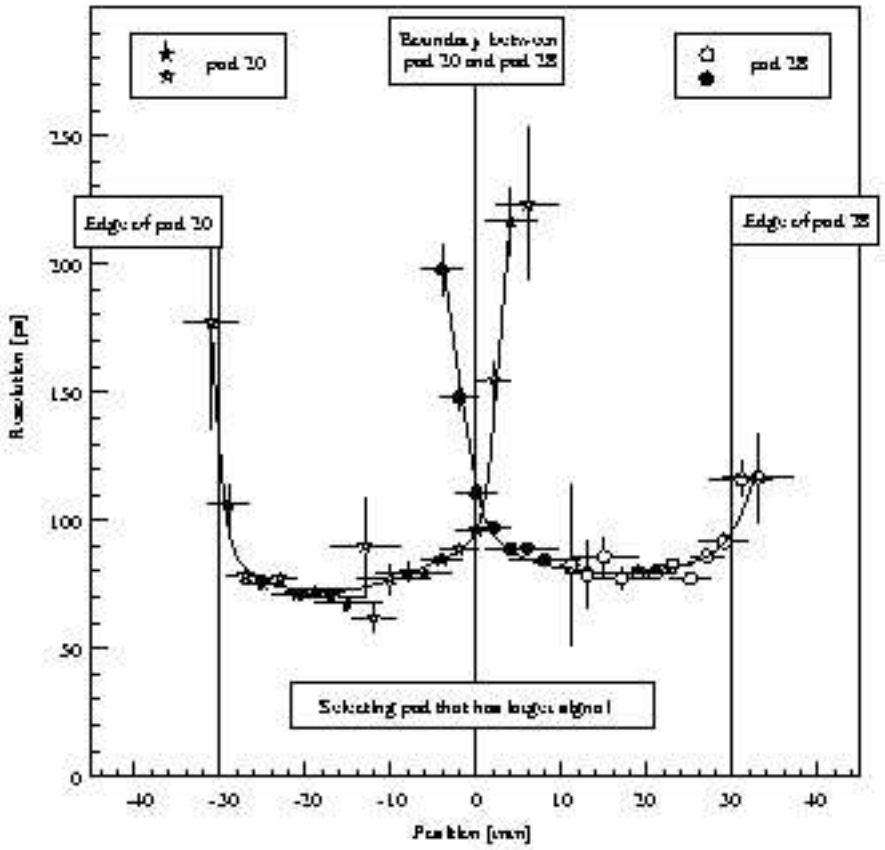
50 *ps* ⟶ **70** *ps* on the **47** *%* of the pad area





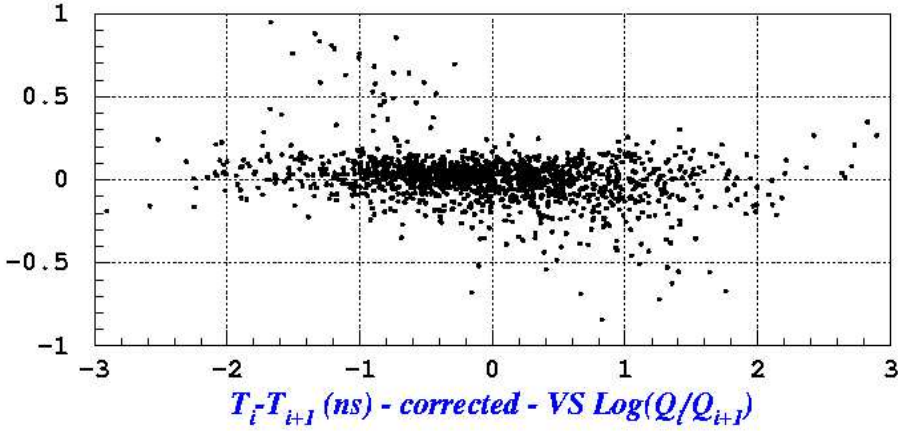
Overall time resolution: from **150** *ps* in the past to **120** *ps* in the present

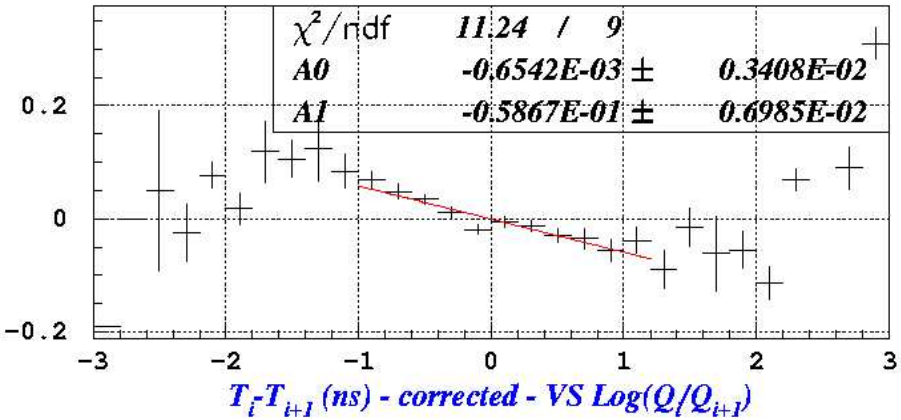
Time Resolution (2)

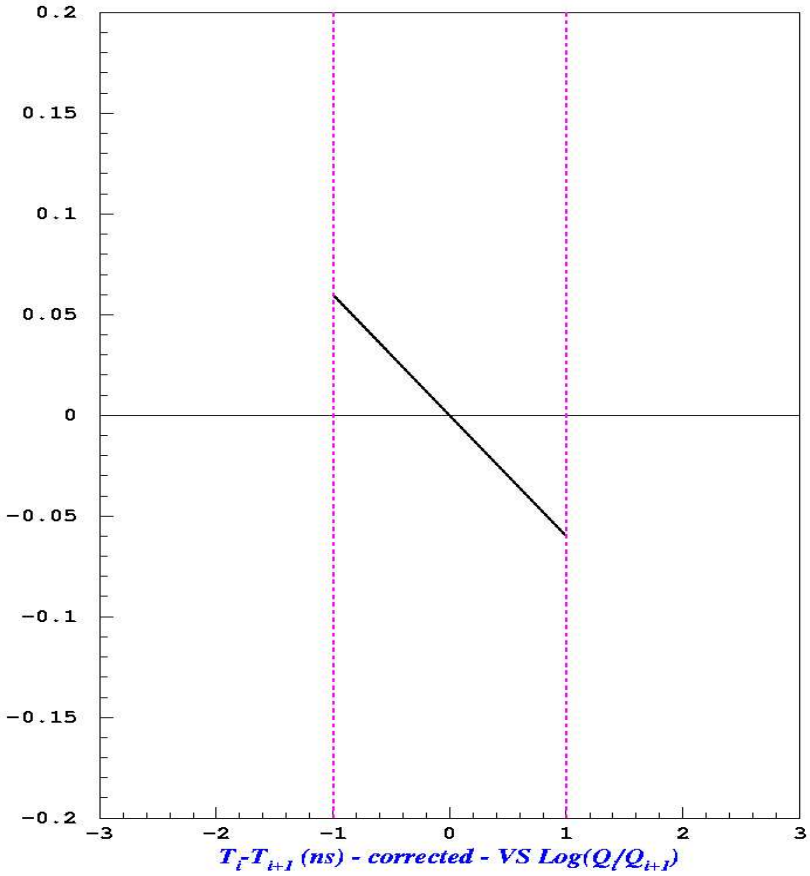


Time resolution as a function of position.
The solid lines are to guide the eye.

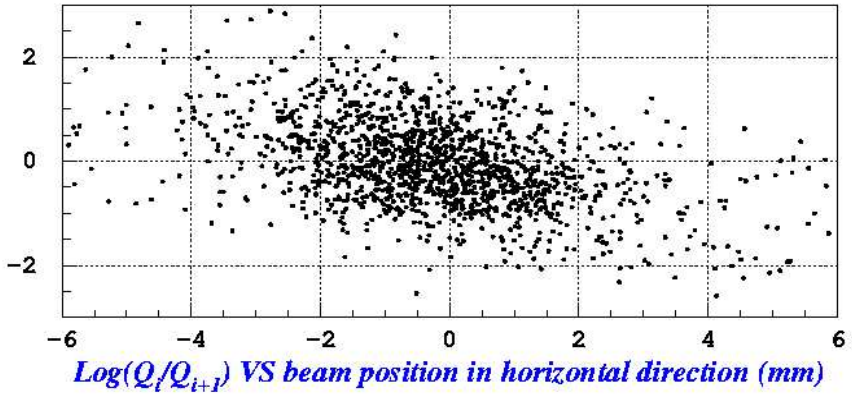
Border Effect (1)

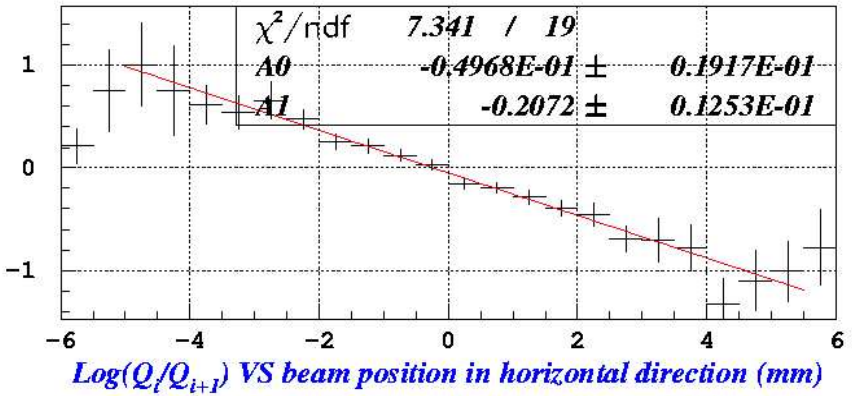


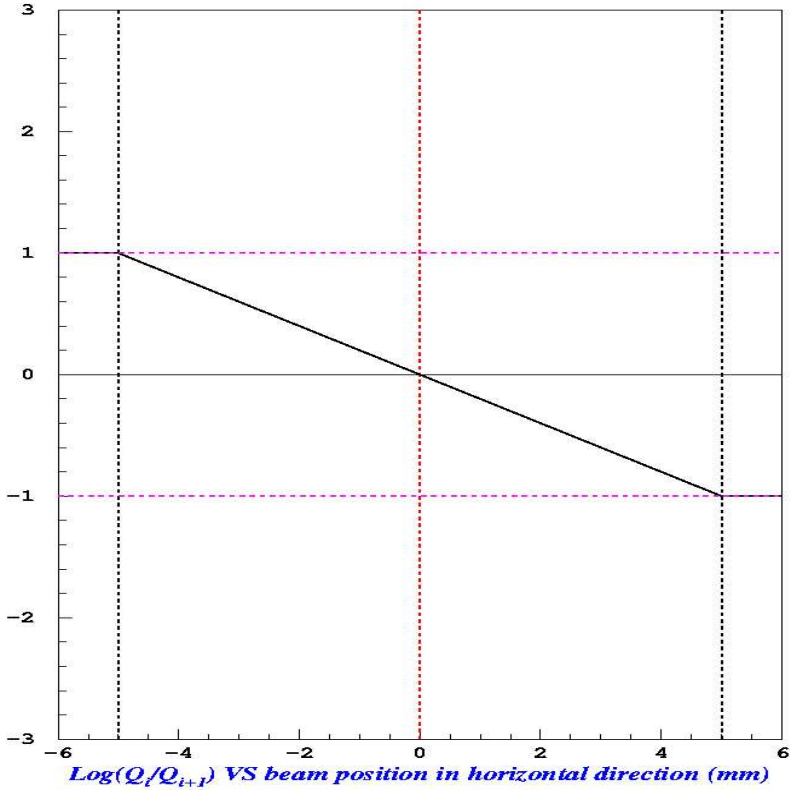




Border Effect (2)







Border Effect (3)

Then, the maximum time delay simulated is **125** *ps*

But, in one Hijing event Pb-Pb, the time delay of the TOF digits are bigger than **100** *ps* in less than **1** % of the cases.

N.B.:The primaries reach the TOF detector in the average time-of-flight equals ~**15** *ns*.

TOF Simulation code

❶ Efficiency curve

❷ Time Resolution curve

❸ Time Delay curve

❹ Weight curve

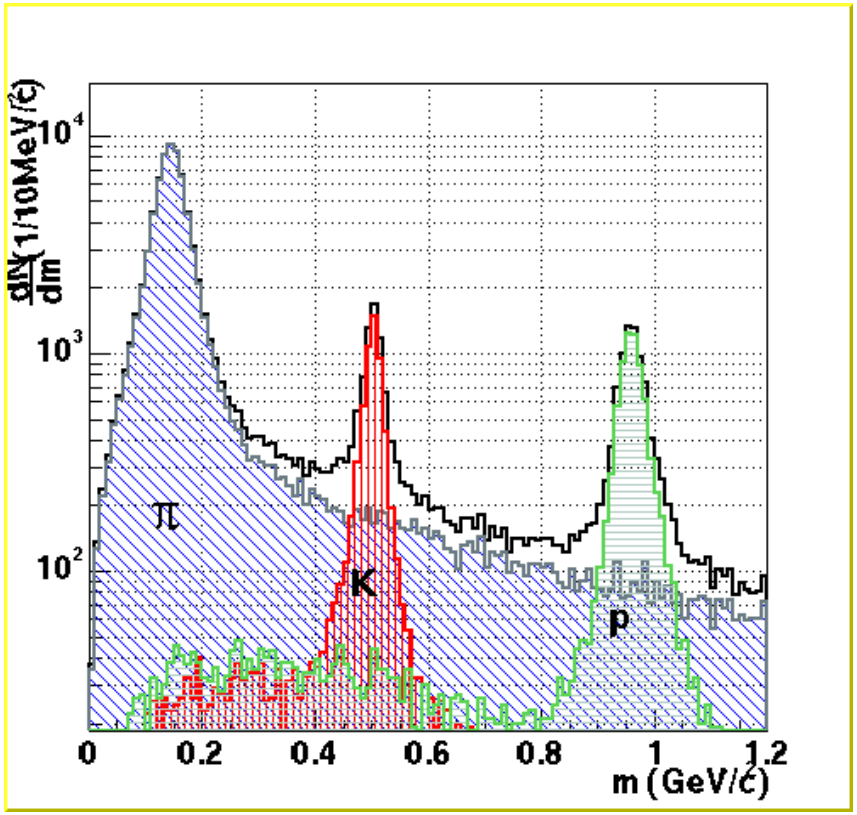
} **BorderEffect**

BorderEffect is a method of the new class:

AliTOFReconstructioner

Results for Reconstructioner

- Mass Separation (50 Hijing events at 0.4 T)
- 0.5 *GeV/c* < *p* < 2.5 *GeV/c*



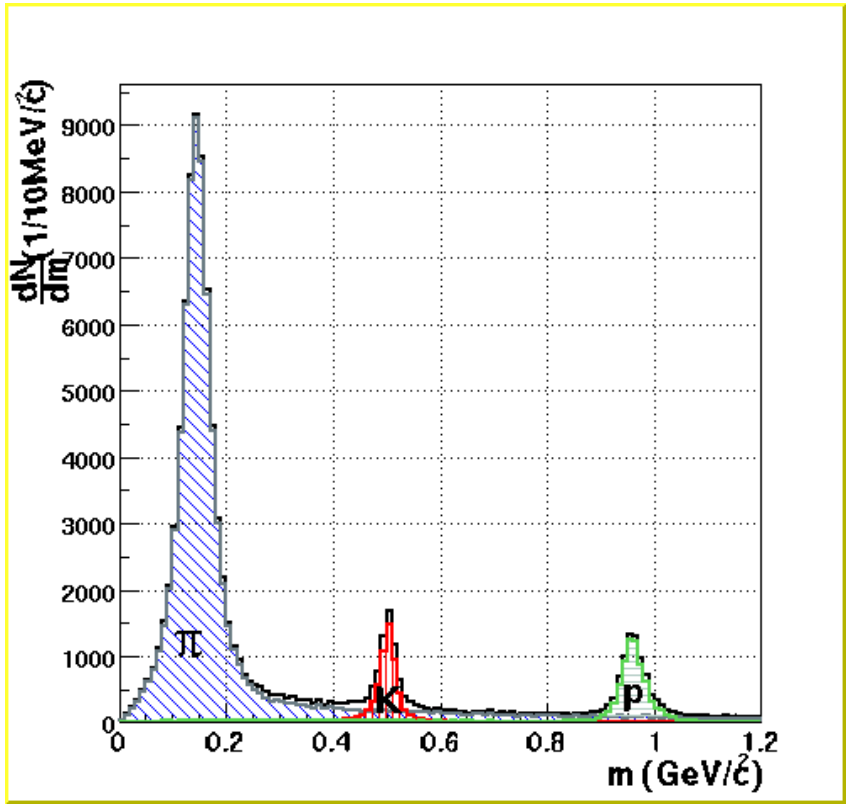


Table for particle identification (PID) (1)

Overall PID efficiencies (%) and contaminations (%) in different momentum ranges for primary hadrons generated in the $|\theta - 90°| < 45°$ region; 100 HIJING events: at 0.2 T and , in brakets at 0.4 T.

Primary hadrons	*Momentum range* (GeV/c)	*Efficiency* (%)	*Contamination* (%)
$\pi^{\pm}$	$0.15 \leqslant p \leqslant 2.5$	63 (48)	7 (9)
$K^{\pm}$	$0.3 \leqslant p \leqslant 2.5$	14 (13)	13 (15)
$p(\overline{p})$	$0.4 \leqslant p \leqslant 4.5$	27 (24)	5 (7)
$\pi^{\pm}$	$0.5 \leqslant p \leqslant 2$	74 (72)	11 (12)
$K^{\pm}$	$0.5 \leqslant p \leqslant 2$	23 (21)	11 (12)
$p(\overline{p})$	$0.5 \leqslant p \leqslant 2$	37 (33)	5 (7)

Software Code Status and Plans

- AliTOFReconstructioner ready to be committed to the CVS repository
- AliTOFReconstructioner is a derived class from TTask
- Ready to move from Hits2Digits, Hits2SDigits to AliDigitizer
- Noise, electronics couplings, border effect implemented within AliTOFReconstructioner code.