A framework to test PID inputs

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Outlook

- Script to test the PID inputs
- Results: problems with SVT and DCH
  DRC better (with simple fitter model)

Test program of the PID inputs

Main goal is to look at subsystem inputs in different theta and momentum regions

Use output root files generated by PacPidNtupleApp

Files of the test program

```
PacPidCalib/PidCalibApp.C                    ---> main program
PacPidCalib/PidCalibConst.h                  ---> file with all constants (momentum and theta range, number of bins)
PacPidCalib/PidCalib.C, PidCalib.h           ---> class which loops over events and fill histograms from HistContainer
PacPidCalib/HistContainer.C, HistContainer.h ---> class which contains histograms and functions to initialize them
PacPidCalib/PidCalibMakefile                 ---> make file for PidCalib application
PacPidCalib/PidCalibBuildPs.C                ---> root script to build plots and save them in ps format
PacPidCalib/runJobsPacPidCalib.pl            ---> perl script to run jobs, analyse root files and build plots
```

* Code committed to SVN last week

* Should these files be split in two directories (src and include)?

Script for testing of the PID inputs

Available documentation:

http://mailman.fe.infn.it/superbwiki/index.php/FastSimDoc/PID_simulation

- Script was tested on bbr-serv08 at CNAF
- The script runJobsPacPidCalib.pl has to be copied to you workdir before being executed from there.
- Three steps have to be done in order to get PID quality plots.

Step 1/3 is to generate the 10 particle types (e^+, e^-, μ^+,μ^-, π^+, π-, K^+, K^-, p^+,p^-).

Step 2/3 analyses of root files generated by FastSim.

Step 3/3 build plots

- If you're lost, run the script with no option to get a help message

Quality plots in different momentum and theta regions

Plots are placed in 6 different subfolders in one root directory which path is chosen by the user:

```
TrackSelectors    ---> efficiency plots of track selectors
                       (GoodTracksLoose ...)

PullsAndQuality   ---> quality plots (pulls, etc.) of input PID
                       variables provided by the different subsystems

ElectronSelector ---> efficiency plots of existing electron selectors

MuonSelector      ---> efficiency plots of existing muon selectors

PionSelector      ---> efficiency plots of existing pion selectors

KaonSelector      ---> efficiency plots of existing kaon selectors
```

FastSim version V0.1.3

ReleaseFiles>svn status -v

186	186 brownd	.
186	186 brownd	Patches
186	183 stroili	Packages

Date of last change of the ReleaseFiles/Patches - Dec 23

Results

You can find all plots in the following directories

momentum region is from 0 to 1 GeV . x - axis is reconstructed momentum

http://www.slac.stanford.edu/~burmist/BABARoutPutData0_1GeV_recMom_06012010/

momentum region is from 0 to 5 GeV . x - axis is reconstructed momentum

http://www.slac.stanford.edu/~burmist/BABARoutPutData0_5GeV_recMom_06012010/

momentum region is from 0 to 1 GeV and in the x axis is true momentum

http://www.slac.stanford.edu/~burmist/BABARoutPutData0_1GeV_trueMom_06012010/

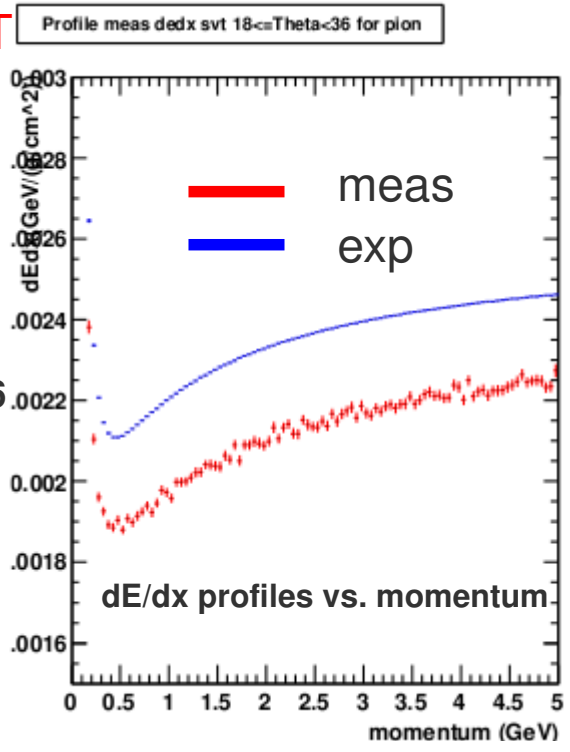
momentum region is from 0 to 5 GeV and in the x axis is true momentum

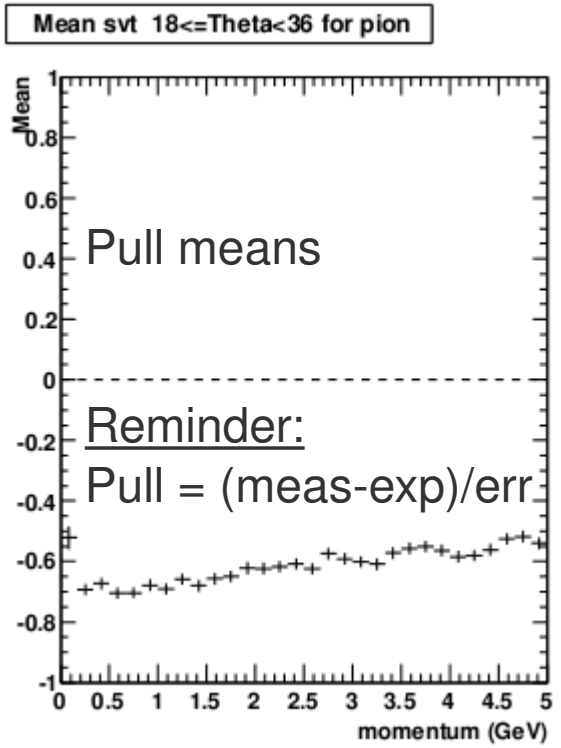
http://www.slac.stanford.edu/~burmist/BABARoutPutData0_5GeV_trueMom_06012010/

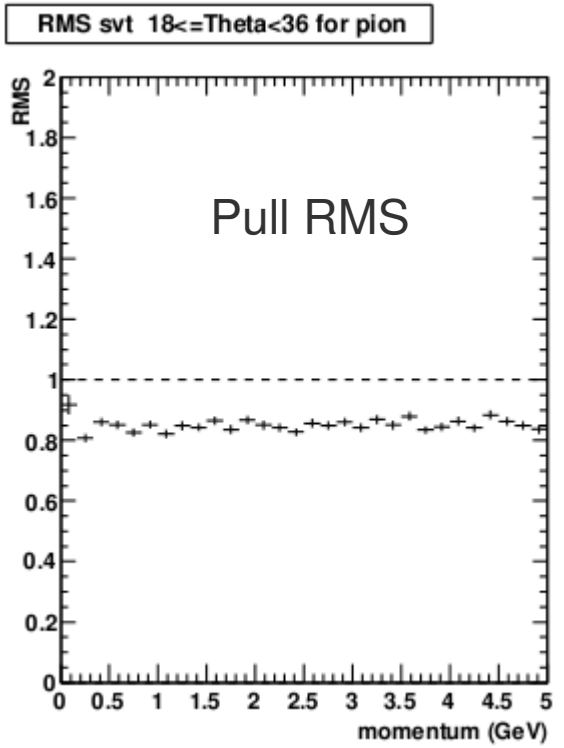
Reminder: in FastSim, all track lists (GoodTrackVeryLoose, etc.) use exactly the same selection criteria => their contents are the same.

Results SVT

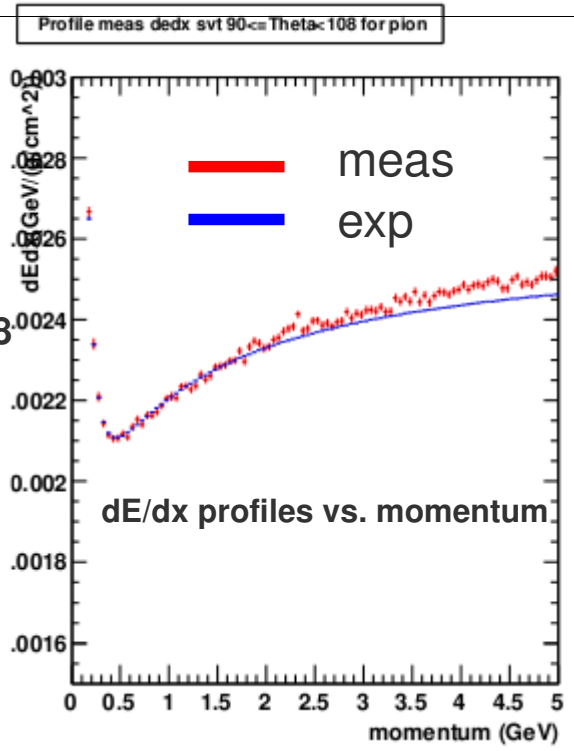
18<Theta<36

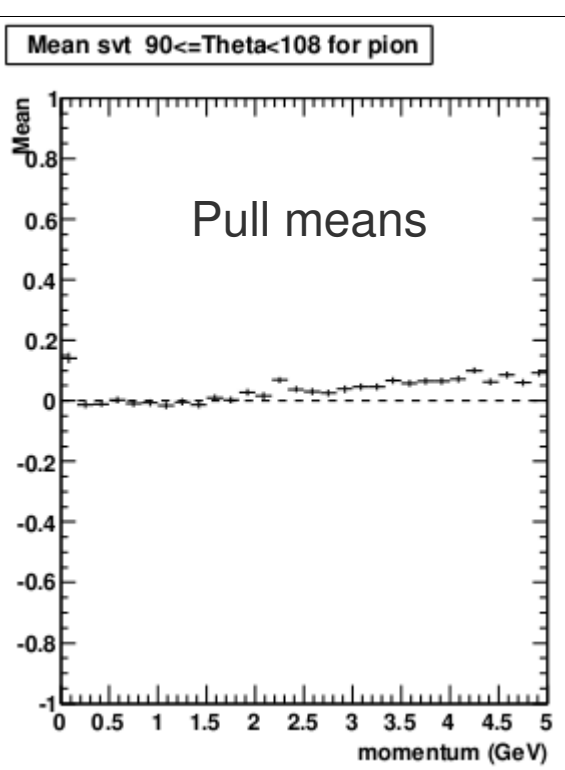


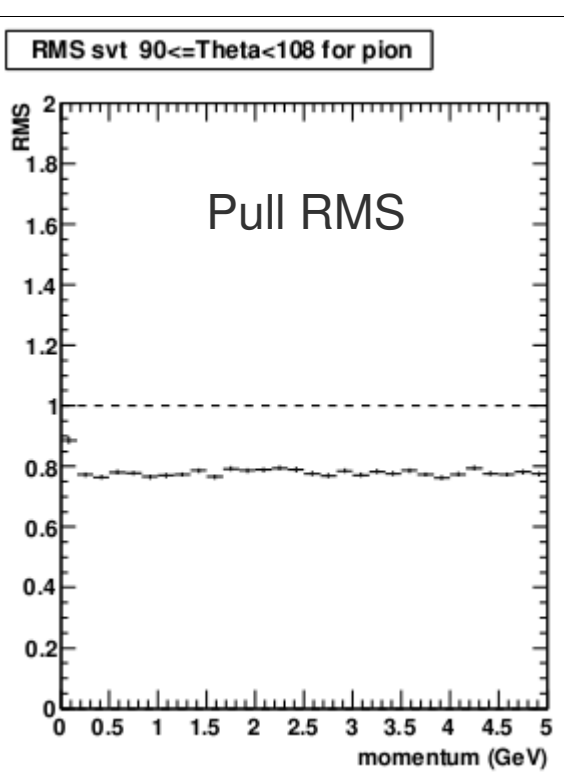




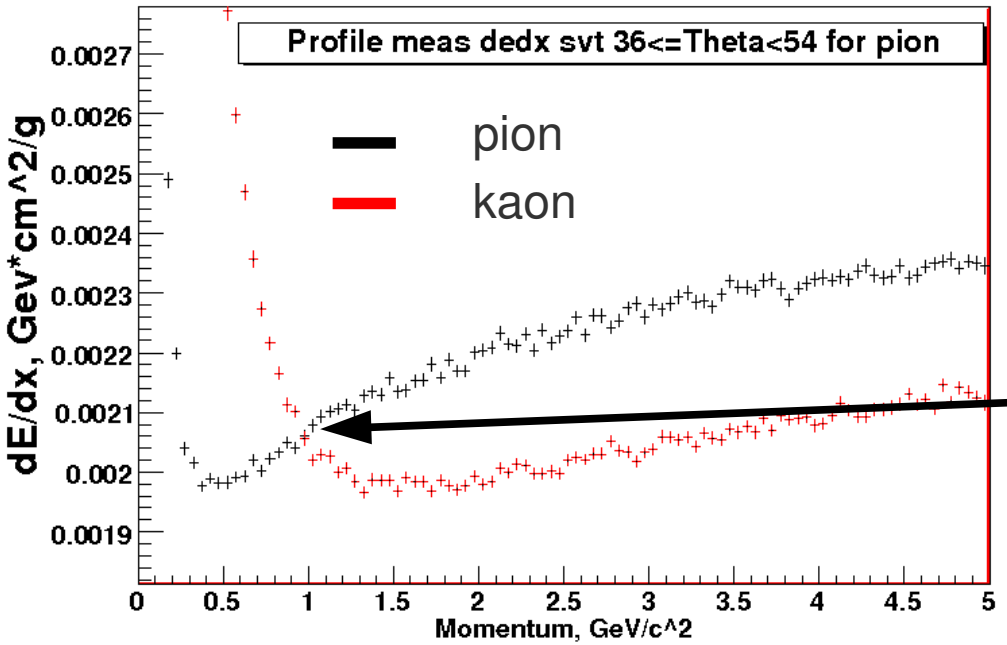
90<Theta<108

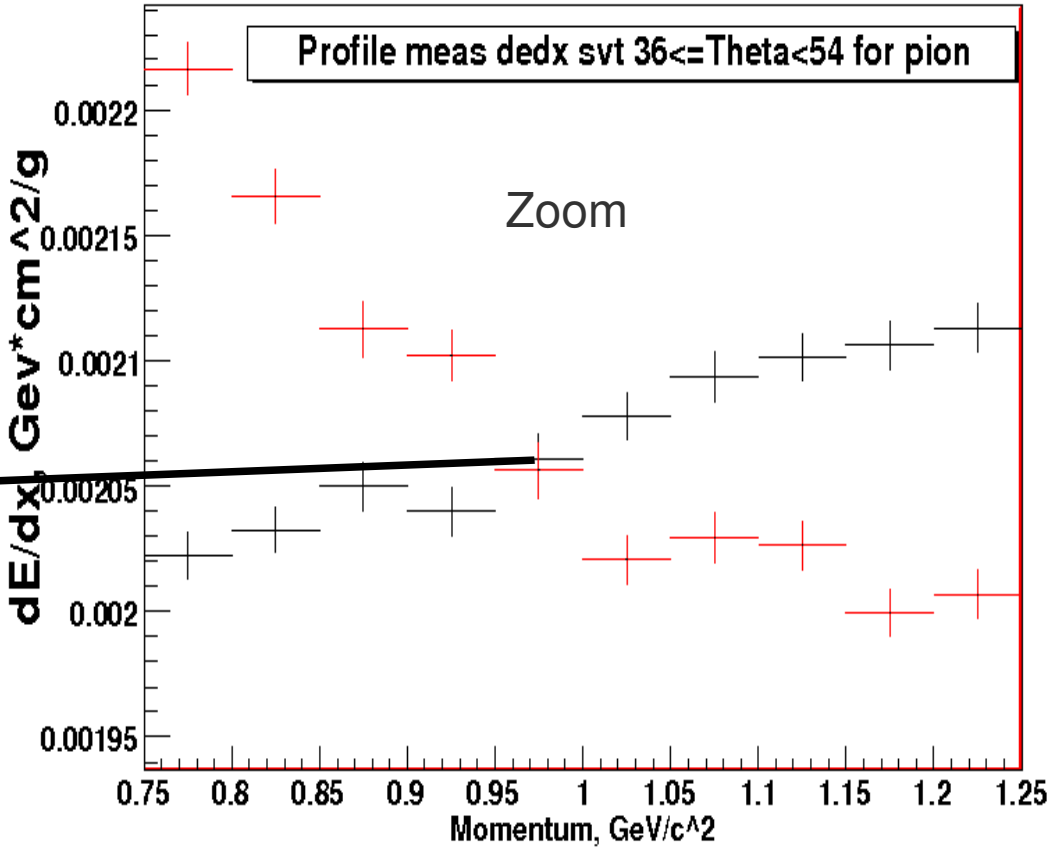






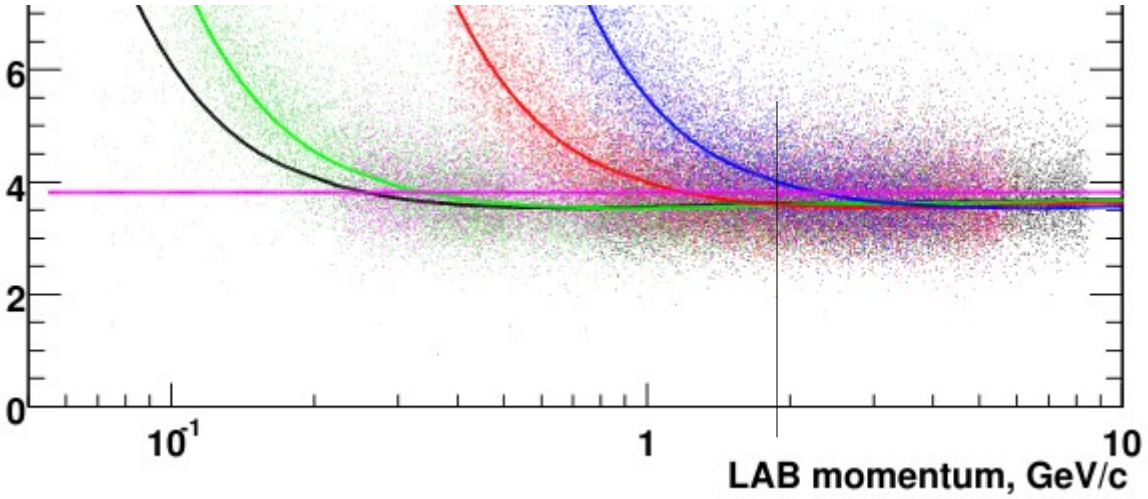
Results SVT





Null K/π separation is at 0.98 GeV/c [FastSim]

Pi K

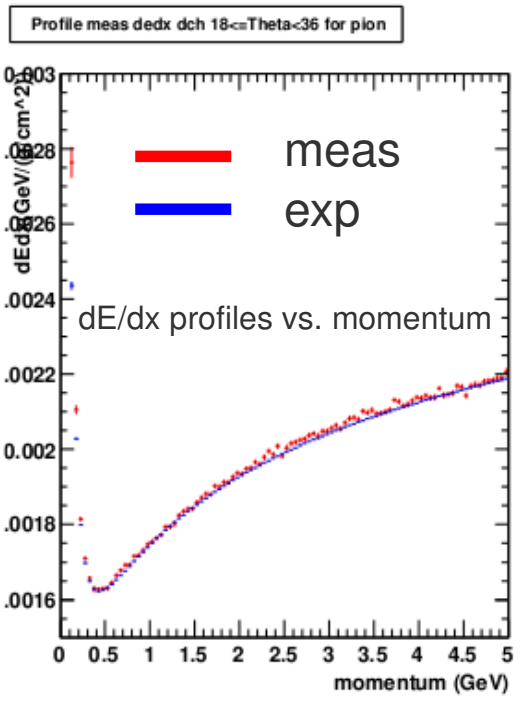


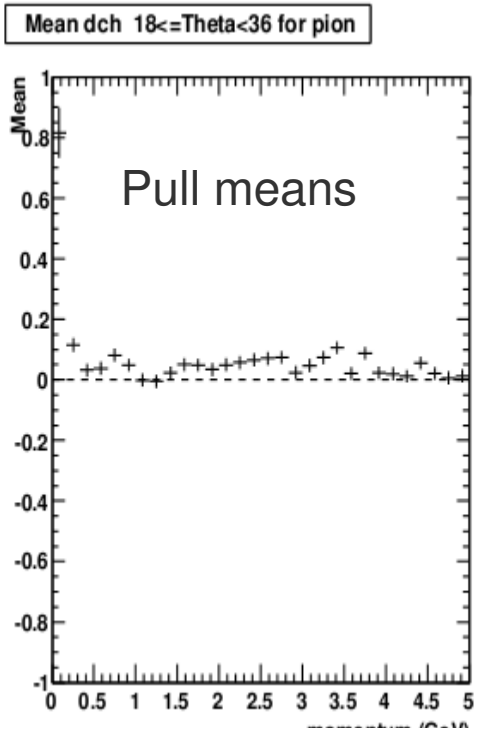
BaBar
BAD 1500

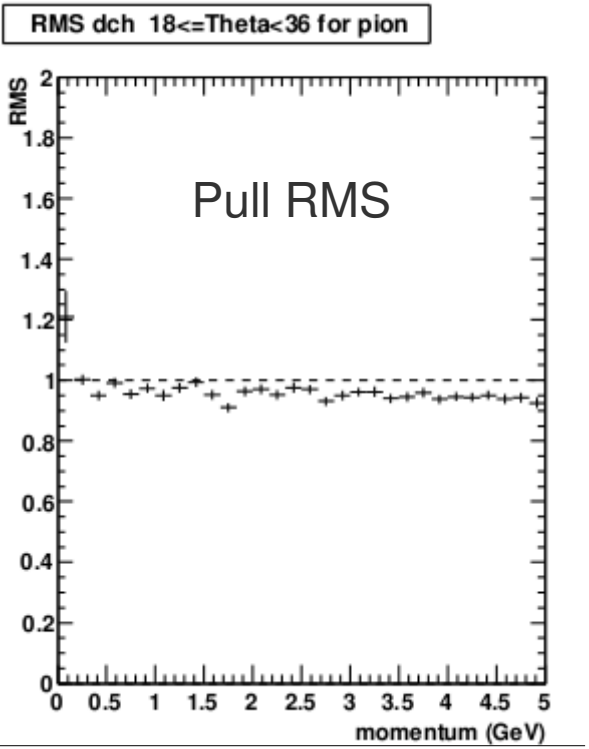
Minimum is at 1.7-1.8 Gev/c

Results DCH

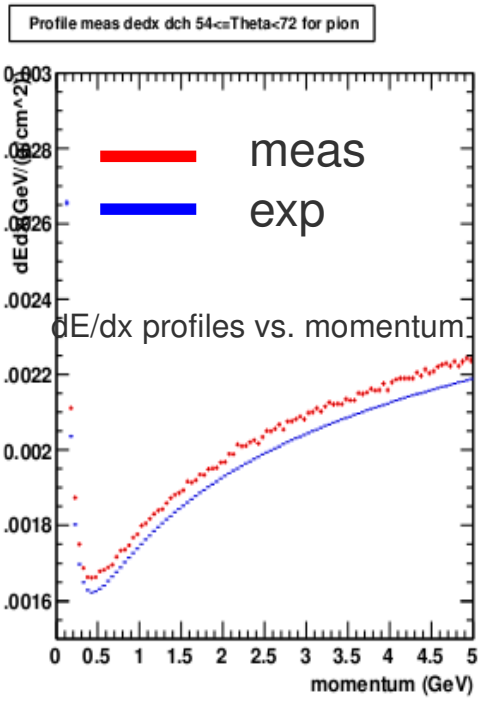
18<Theta<36

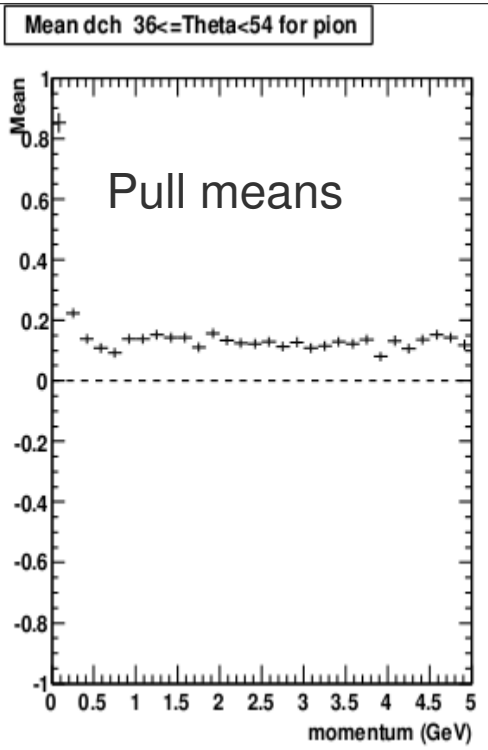


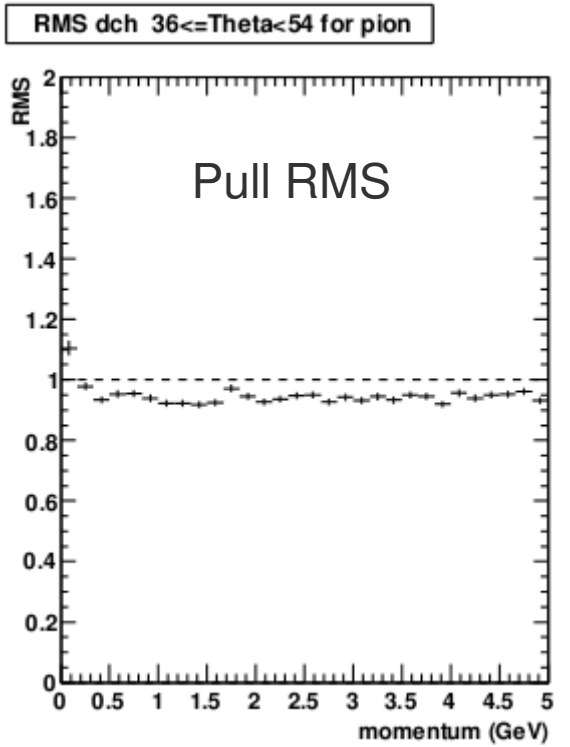




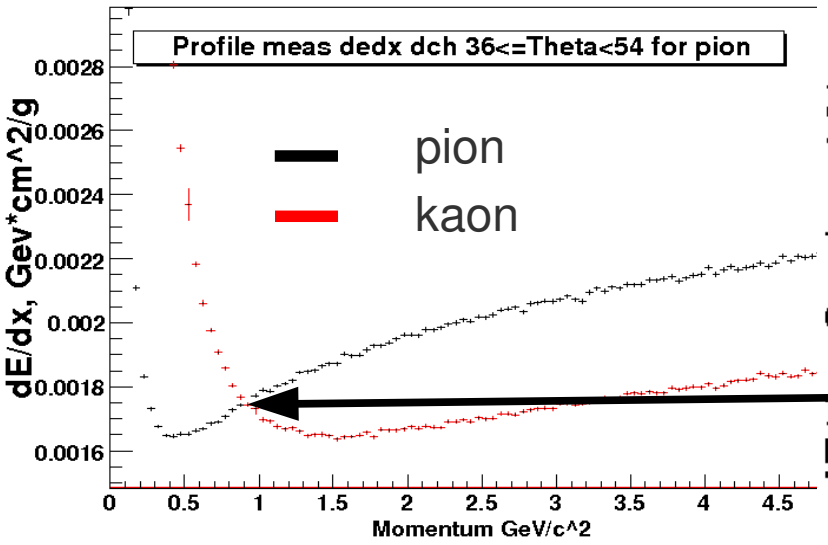
54<Theta<72



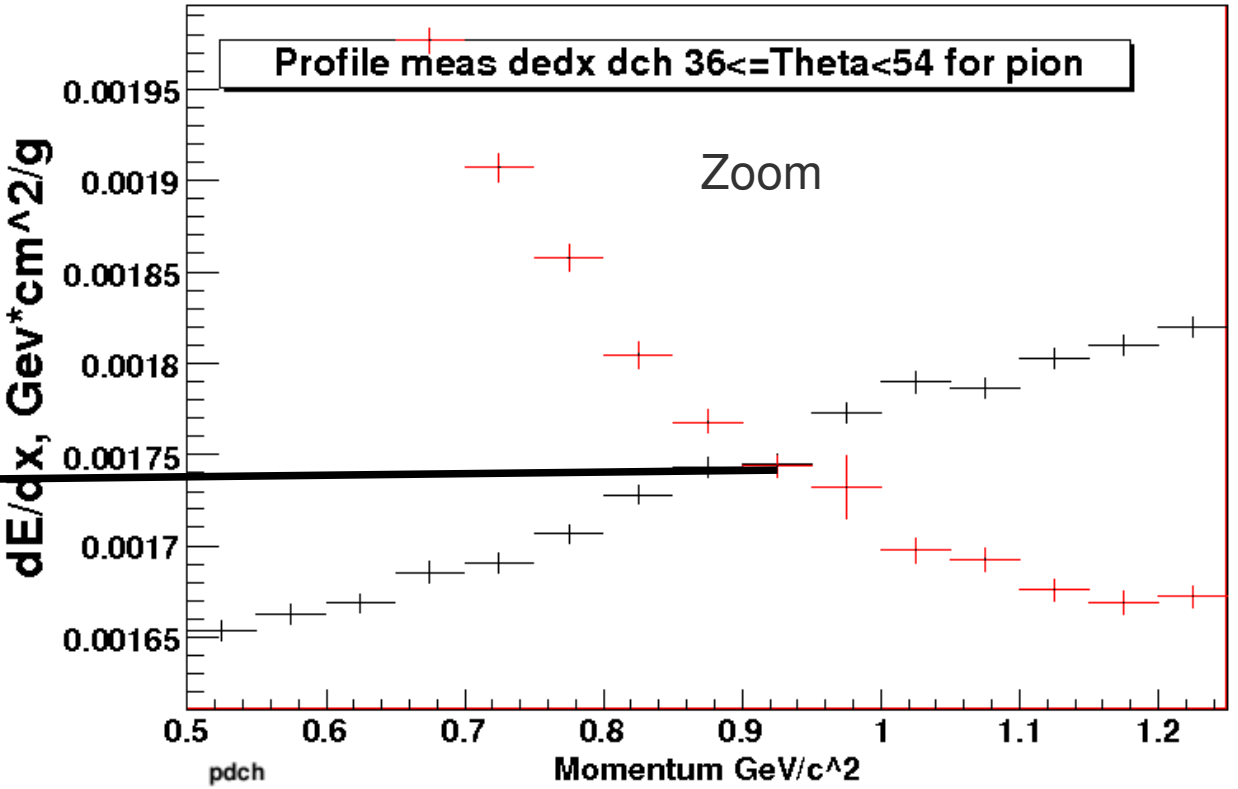


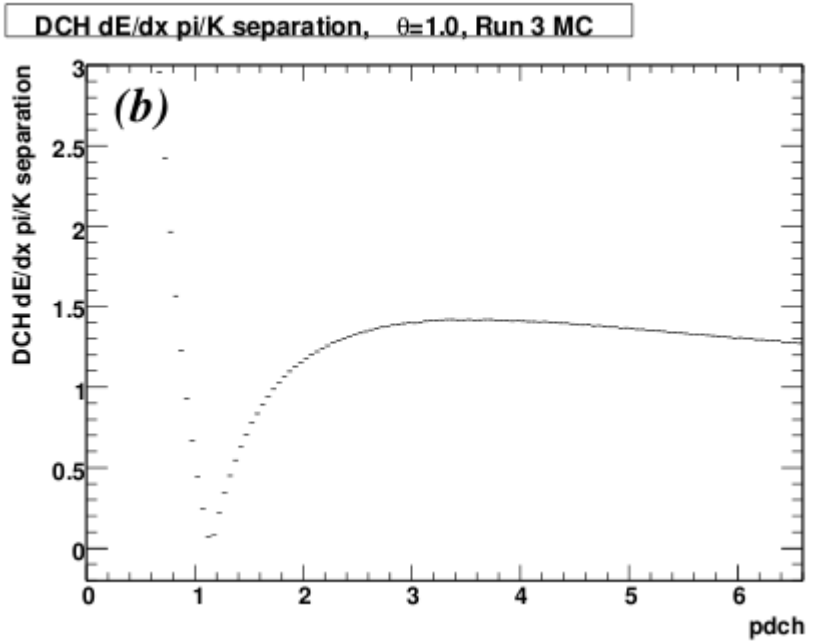


Results DCH



Null K/Pi separation is at 0.92 GeV in FastSim

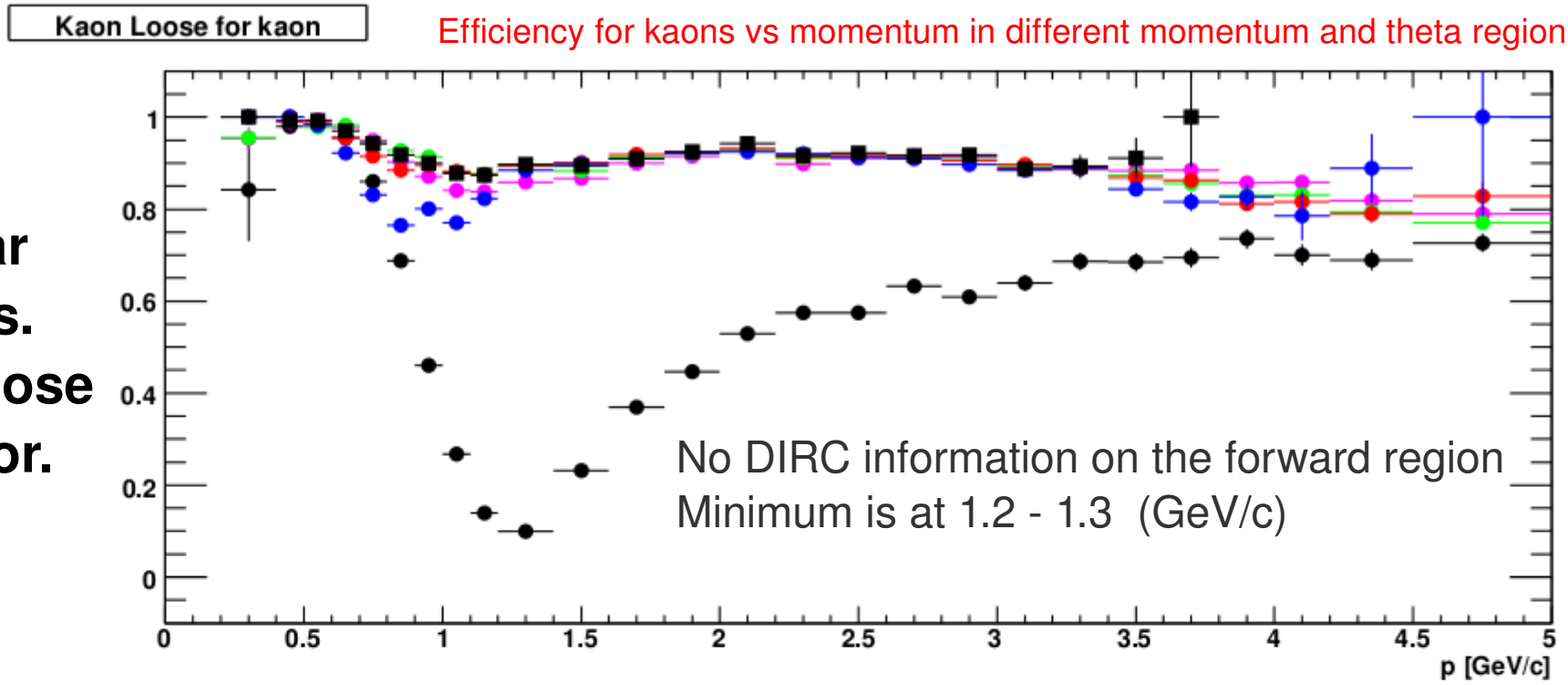




Null K/π separation is at 1.1 GeV for BaBar BAD 1500

<u>Matteo :</u> this difference comes from the way dE/dx is simulated in FastSim (Gaussian instead of Landau)

BaBar tables. Kaon loose Selector.



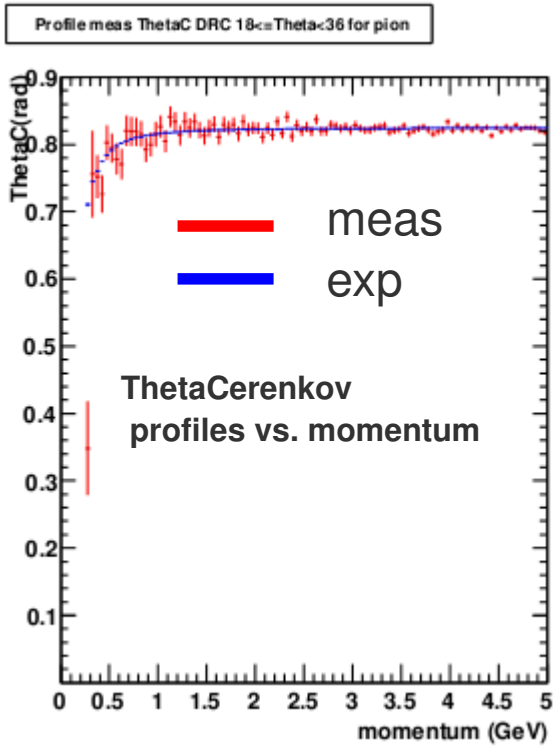
Forward	20.05 <theta<	25.78 -
Barrel	25.78 <theta<	40 -
	40 <theta<	60 -
	60 <theta<	75 -
	75 <theta<	95 -
	95 <theta<	146.1 -

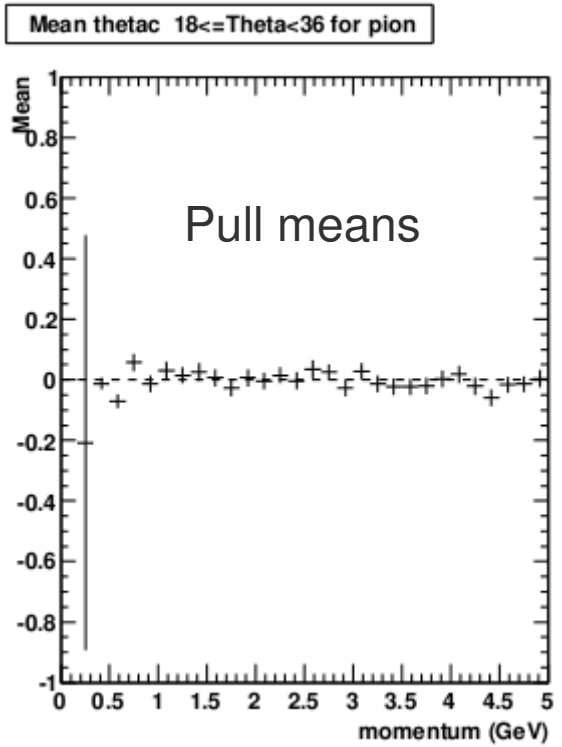
Minimum K/π separation for :
SVT is at 1.7-1.8 GeV/c
DCH is at 1.1 GeV/c

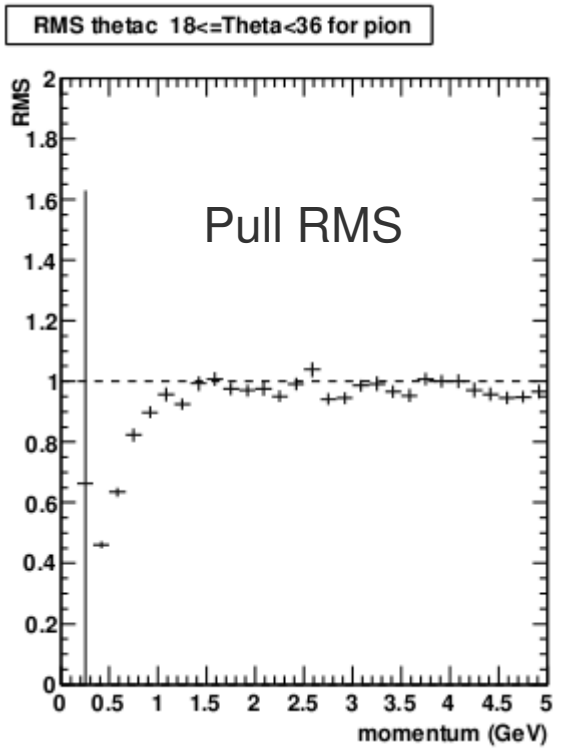
Combination between SVT and DCH shift minimum in separation

Results DRC

18<Theta<36







72<Theta<90