

Automatic check of reconstruction performance - Tuning of the selection criteria

Marian Ivanov & Jacek Otwinowski
GSI - Darmstadt

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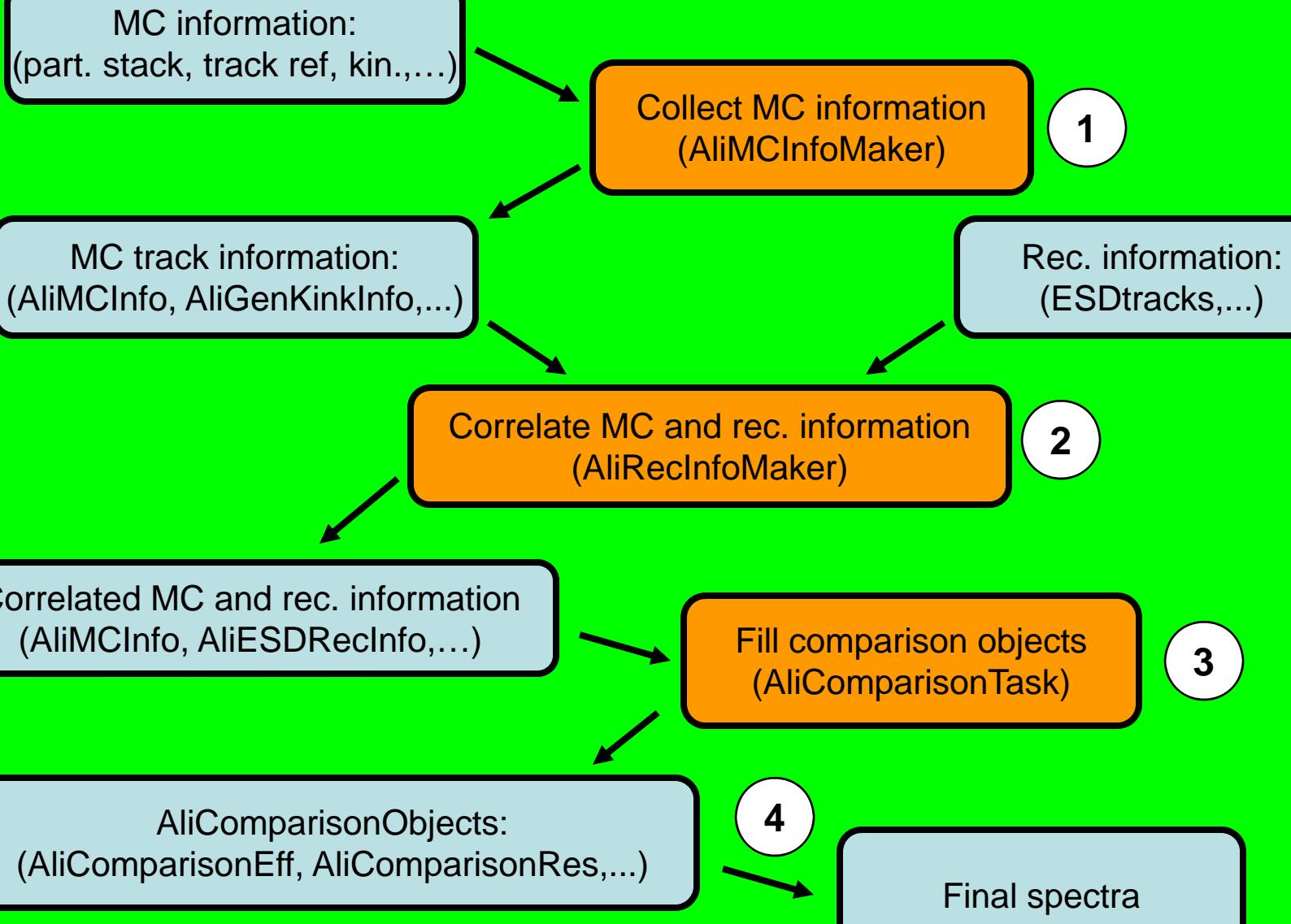
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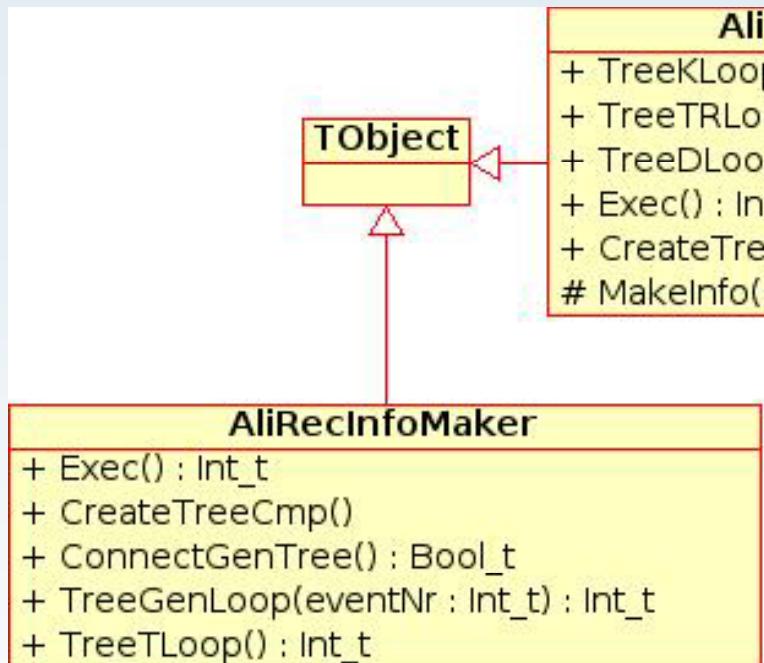
PWG1 library

- PWG1 library has been started to check TPC/track reconstruction performance based on MC simulations
- Requirements:
 - Functionality to compare MC and reconstruction information
 - A way to apply selection criteria (cuts)
 - Objects to store comparison information and selection criteria
- Current PWG1 implementation allow us:
 - check TPC signal reconstruction
 - check tracking performance (TPC+ITS)

Analysis scheme (reconstruction check)



Correlation of MC and reconstruction information



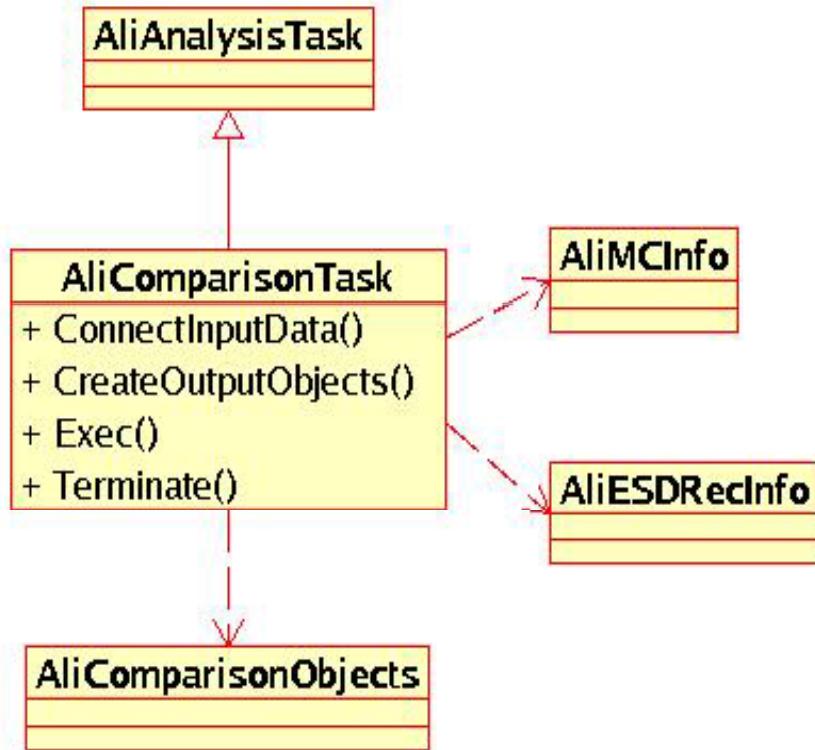
Input to comparison procedure.

- **AliGenInfoMaker**
 - Collect MC information (kin., track ref., digits, part. stack)
 - Create output tree with **AliMCInfo** objects for each particle track
- **AliRecInfoMaker**
 - Correlate MC and reconstruction information (**AliMCInfo** and **AliESDtracks**)
 - Create output tree with **AliMCInfo** and corresponding **AliESDRecInfo** objects for each particle track

Implementation (AliRoot trunk):

PWG1/AliGenInfoMaker.cxx
PWG1/AliRecInfoMaker.cxx
PWG1/AliMCInfo.cxx
PWG1/AliESDRecInfo.cxx

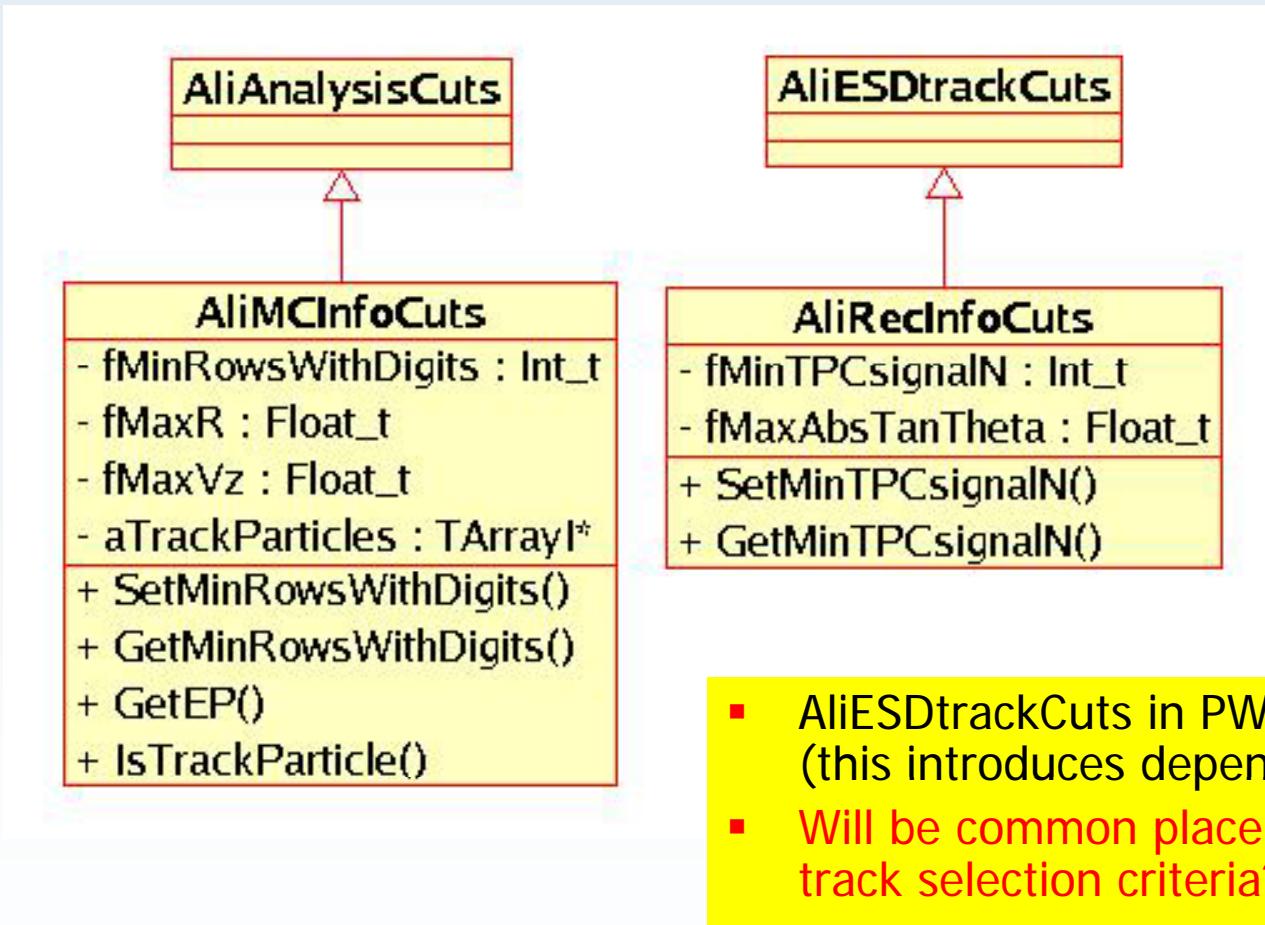
AliComparisonTask



- Can be run locally/Proof/Grid
- ConnectInputData()
 - Connect input tree with **AliMCInfo** and **AliESDRecInfo** objects
- CreateOutputObjects()
 - Set output objects (comparison components)
- Exec()
 - Fill output objects
- Terminate()
 - Write output objects to file

Implementation: AliRoot trunk (PWG1/AliComparisonTaskcxx)

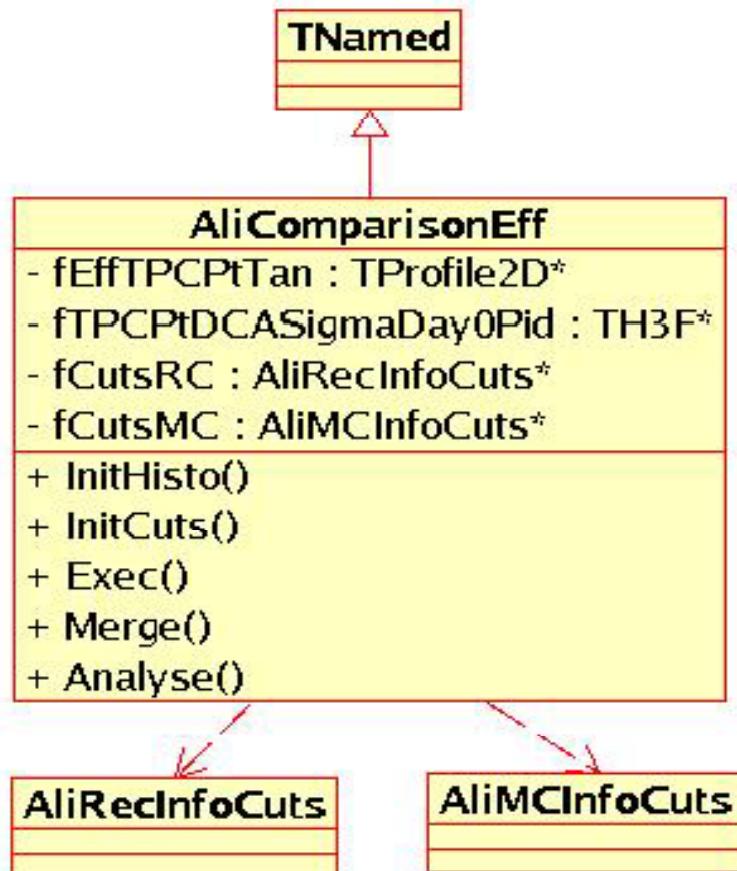
Selection criteria (cuts)



- **AliESDtrackCuts** in PWG0 library
(this introduces dependency)
- Will be common place for ESD track selection criteria?

Implementation: AliRoot trunk (**PWG1/AliMCInfoCuts.cxx**, **PWG1/AliRecInfoCuts.cxx**)

Comparison objects (components)



- Can be used locally/Proof/Grid
 - Keep comparison information (THN histograms) and cuts
 - Exec()
 - Fill data members (THN histograms)
 - Merge()
 - Merge comparison object (required by Proof)
 - Analyse()
 - Analyse its data members (THN histograms) by using statistical methods → final spectra
- Which statistical methods should be used in the analysis of THN histograms (STAT or AliMathBase)?

Implementation: AliRoot trunk (e.g. PWG1/AliComarisonEff.cxx)

SVN status of PWG1

- All classes needed to make correlation and comparison of MC and reconstruction information have been committed to SVN

<http://alisoft.cern.ch/viewvc/trunk/PWG1/?root=AliRoot>

User macro: MC/reconstruction correlation

```
// ROOT/CINT interpreted macro
//
// load AliRoot libraries
gSystem->Load("libANALYSIS.so");
gSystem->Load("libPWG0base.so");
gSystem->Load("libPWG1.so");

// collect MC information
AliGenInfoMaker *infoMC = new AliGenInfoMaker("galice.root","genTracks.root",0,0);
infoMC->Exec();

// correlate MC and reconstruction information
AliRecInfoMaker *infoMCR =
    new AliRecInfoMaker("genTracks.root","cmpESDTracks.root","galice.root",0,0);
infoMCR->Exec();
```

cmpESDTracks.root – output file with correlated information

User macro: MC/reconstruction comparison

```
// ROOT/CINT interpreted macro
//
// load AliRoot libraries
-- USER code
// make input chain from "cmpESDTracks" trees
-- USER code
// create MC and ESD track cut objects
-- USER code
// create comparison objects and set their cuts
-- USER code
// create comparison task object and set comparison objects
-- USER code
// run analysis
-- USER code
```

Example: AliRoot trunk (PWG1/Macros/RunGSI.C)

Example: AliRoot trunk (PWG1/Macros/RunAliComparisonTask.C)

User code: example

```
// create MC and ESD track cut objects
AliRecInfoCuts *pRecInfoCuts = new AliRecInfoCuts();
pRecInfoCuts->SetPtRange(0.15,200.0);

AliMCInfoCuts *pMCInfoCuts = new AliMCInfoCuts();
pMCInfoCuts->SetMinRowsWithDigits(50);

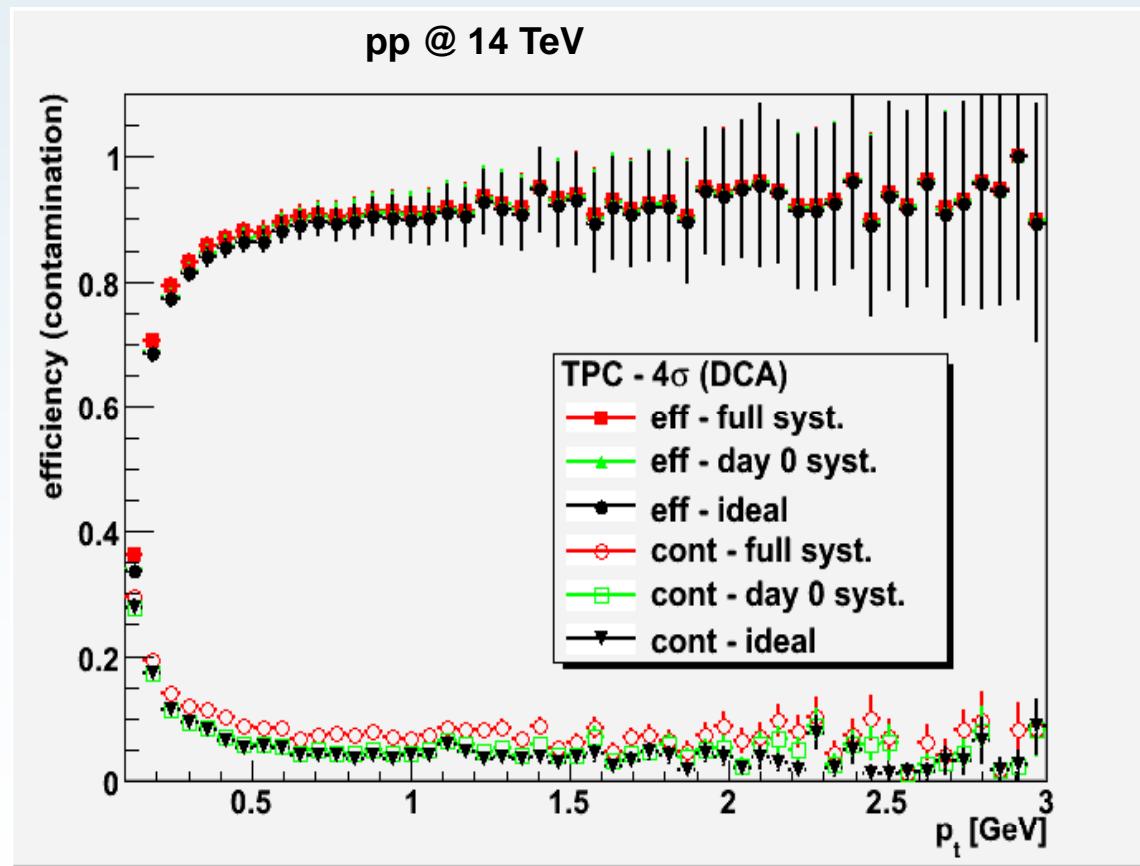
// create comparison objects and set their cuts
AliComparisonRes *pCompRes = new AliComparisonRes();
pCompRes->SetAliRecInfoCuts(pRecInfoCuts);
pCompRes->SetAliMCInfoCuts(pMCInfoCuts);

// create comparison task object and set comparison objects
AliComparisonTask *task = new AliComparisonTask;
task->SetAliComparisonRes( pCompRes );
```

Example: AliRoot trunk (PWG1/Macros/RunAliComparisonTask.C)

Analysis example I

AliRoot: v4-11-Rev-03 + PWG1 (trunk)
(10000 MB pp @ 14 TeV, ideal geom., $B=0.5$ T, $-1 < \eta < 1$, MC and ESD track cuts applied)

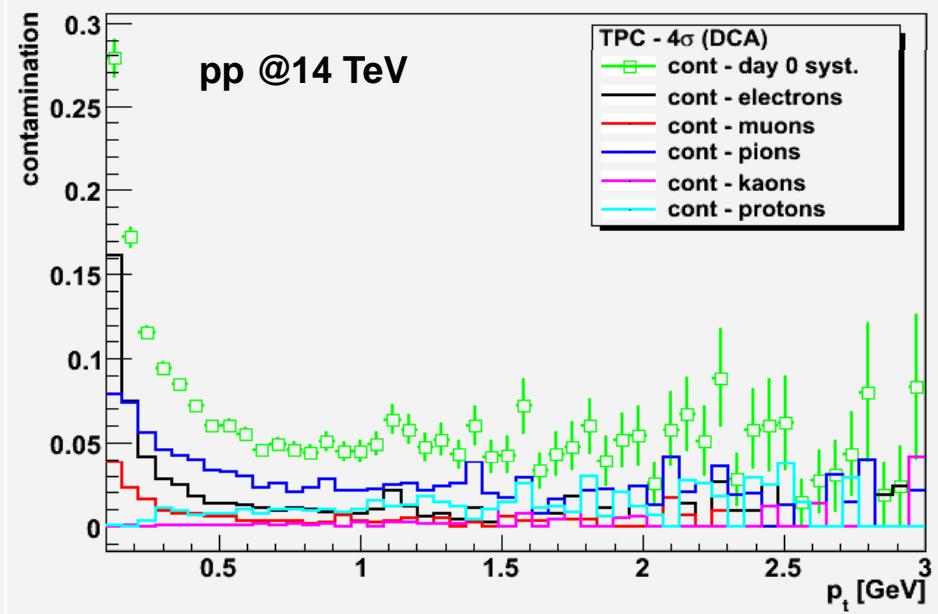
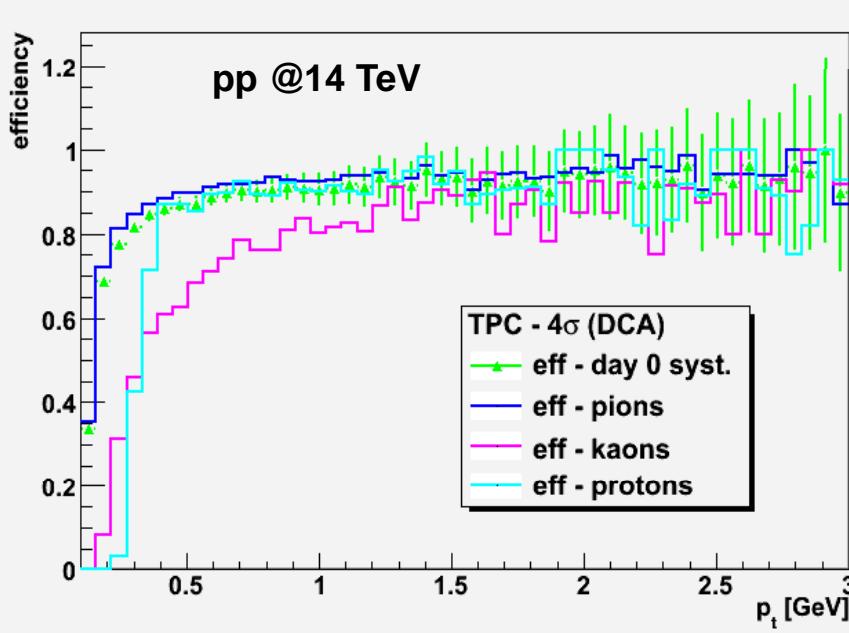


TPC systematic effects (details in M.Ivanov talk Alice Physics Week – March 2008 Prague)

Analysis example II

AliRoot: v4-11-Rev-03 + PWG1 (trunk)

(10000 MB pp @ 14 TeV, B=0.5 T, ideal geom., $-1 < \eta < 1$, MC and ESD track cuts applied)



Outlook

- Basic components of PWG1 library have been presented
- Development of PWG1 is ongoing
- The automatic procedure to check TPC/track reconstruction performance (each AliRoot release) using PWG1 library has been started (<http://alice-wiki.gsi.de/cgi-bin/view/Data>)
 - Goal → To have TPC/track reconstruction under control !!!
- TRD detector started to use PWG1 to check tracking performance
- Other users can follow our examples
- We are looking for your feedback