Updates from... Cosmic-ray data with the latest alignment



Istituto Nazionale di Fisica Nucleare

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PREAMBLE

A "guinea pig" was needed to test the increased segmentation and the line fitter with the millipede method

> Aiqiang suggested to use the following packages CgemLineFit-00-00-25 CgemGeomSvc-00-00-31-p03 CgemAlignAlg-00-00-07

> > Other used packages: CgemClusterCreate-00-00-32 ReadCosmicRayData-00-00-26



HOW TO...

- 1. I used the alignment parameters that the Millipede gives as an output (I see that there are small differences wrt the ones in /CgemGeomSvc/dat/CgemAlignPar.txt <- which is the correct one?)
- 2. I modified the jobCosmicAlign.txt example (found in the /share folder of CgemAlignAlg-00-00-07): • Alignment flag: CgemLineFit.Align_Flag=true #false = no align; true = align; • Alignemnt parameters: parse the correct ASCII file
- - Select TEST plane: CgemLineFit.TEST_N=2// 0=all planes; otherwise choose testplane: 1=L2top, 2=L1top, 3=L1bot, 4=L2bot
 - Add the test_track package and its features
- 3. Run this "new" jobCosmicAlign.txt with: read_cosmic, cluster_create, cgem_linefitter, test_track
- 4. Finally, run the QA CgemCosmicRayQA (NB also here we need to turn on the alignment!)
- 5. Check the files



After a seemingly smooth (kind of plug 'n' play) implementation of the aforementioned packages and features I managed to obtain the two files of interest (namely track.root from the TestTrack and hits.root from the CgemCosmicRayQA)

A problem was spotted in the χ^2 of the tracks, hinting at some alignment/geometry problems (or, as I discovered later on, to a package)

This problem was found also in the "baseline", i.e. the histo.root file I used as a comparison for the new alignment (NA)

Cosmic-ray data with the latest alignment - M. Scodeggio

FIRST PROBLEMS



FIRST PROBLEMS







Use package CgemGeomSvc-00-00-34 (few months ago I did not have the need to co and setup this package, maybe in the workfs migration something changed?)

Use the CgemGeomSvc-00-00-37, otherwise if compiling the CgemGeomSvc-00-00-31-p03 I got the following ERROR message

../src/CgemLineFit.cxx:1959:26: error: 'class CgemMidDriftPlane' has no member named 'getPointAligned_New'

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SOLUTION

Baseline

NA



MORE PROBLEMS...?

I noticed that sometimes (without any - apparent - changes) the code (independently from the release) goes in segmentation violation

not connected TIGER channels 189 ApplicationMgr INFO Application Manager Initialized successfully ApplicationMgr INFO Application Manager Started successfully

*** Break *** segmentation violation
__boot()
import sys, imp, os, os.path



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This does not happen systematically, so I did not manage to pinpoint the origin of it... hence, any suggestion is more than welcome



SOME PLOTS



In NA, a sharp cut @ $\chi^2 = 300$ needs to be investigated

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140958 34.26 54.16

Already the χ^2 distribution shows some discrepancy

fitted track chi2







Despite the difference in the χ^2 , the CC resolution in the L1 shows little to no discrepancy





cc resolution in R * phi (mm) vs L2 ang_{xv}



1. Why L1 and L2 resolution is identical? 2. Why do I have data above 50°?











SOME PLOTS

tpc resolution in R * phi (mm) vs L1 ang_{xv}



Below 50°, little to no discrepancy NA peaks above 80°... why?

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TPC resolution L1

tpc resolution in R * phi (mm) vs L1 ang_{xv}





SOME PLOTS

tpc resolution in R * phi (mm) vs L2 ang_{xv}



1. Why L1 and L2 resolution is identical? 2. Why do I have data above 50°?

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TPC resolution L2





13

CONCLUSIONS

Discrepancies and features are under investigations

For sure I expect no data for L2 above considering the setup in the clean room

At least, the shapes of the curves agree

The TPC is not fully reliable because the correct time calibrations are needed

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A cut at $\chi^2 = 300$ will be applied to see if these features disappear





CONCLUSIONS

During this test, I felt the lack of standardisation and documentation slowed down the whole procedure and gave less clarity to the problem

I feel we would profit from a common repository (a sort of logbook?) where we describe (with some degree of depth) the changes of each release

Even a README file in the /share I think would do the trick

Regarding the standardisation, I know it can be a bother, but maybe common names for variables/classes/etc. could be implemented









For

