DC Group Meeting 5/24/18

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- Align the drift chambers by finding the appropriate “offsets” to minimize the residuals of straight track (B=0) data (rg-a run 2467)

- Investigate the effect on the W^2 elastic peak of shifting the the drift chambers

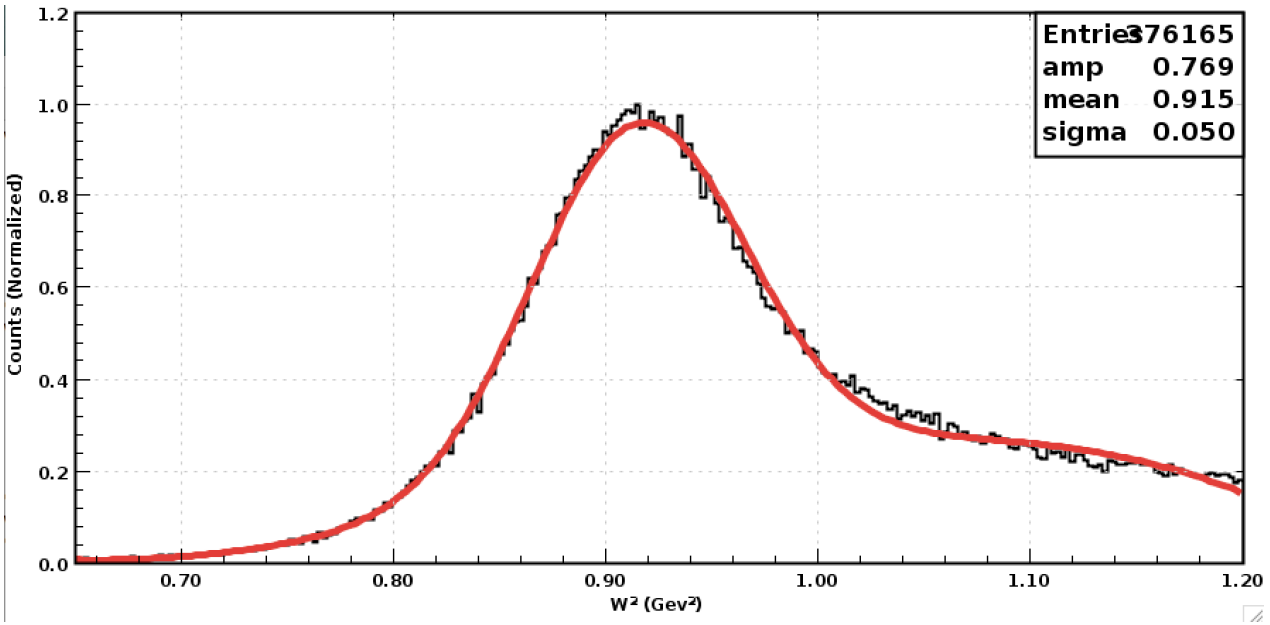
- https://github.com/tbhayward/Clas12_DC_alignment/blob/master/groovy_scripts/elastic_peak.groovy

```
elastic_peak.groovy

Calculates the W^2 elastic scattering peak of the hipo files in a given directory. Intended to be used with
run group A run 2391 (2.2 GeV beam, LH2 target). Loads in the REC::Particle data base and picks out any
events with a reconstructed electron. Calculates W^2 from the reconstructed electron with the highest
momentum.

Arguments:
0 - directory with hipo files to analyze (must be given),
1 - number of files to analyze (if not given assumes all),
2 - minimum bin in W^2 (GeV^2) (if not given assumes 0.65 GeV^2),
3 - maximum bin W^2 (GeV^2) (if not given assumes 1.2 GeV^2),
4 - number of bins (if not given assumes 250)
```

Elastic peak currently shifted to the right! (Primarily affected by the field position, but maybe we can improve it too?)



- coatjava-5c.3.4 allows for
  - geometry database variation is defined via environment variable GEOMETRYDATABASEVARIATION
- Allows for running reconstruction with DC alignment variation tables via
  - setenv GEOMETRYDATABASEVARIATION "test_align”

Default variation

Show 10 entries Search:

superlayer	nsenselayers	nguardlayers	nfieldlayers	thster	thmin	wpdist	cellthickness
1	6	2	2	-6	4.69414	0.386160	3
2	6	2	2	6	4.49536	0.404220	3
3	6	2	2	-6	4.81201	0.621906	3
4	6	2	2	6	4.77064	0.658597	3
5	6	2	2	-6	4.33254	0.935140	3
6	6	2	2	6	4.33275	0.977982	3

Showing 1 to 6 of 6 entries First Previous 1 Next Last

test_align variation (may 2018 engineers)

Show 10 entries Search:

superlayer	nsenselayers	nguardlayers	nfieldlayers	thster	thmin	wpdist	cellthickness
1	6	2	2	-6	4.69143267057017	0.386160010000001	3
2	6	2	2	6	4.49280950384869	0.404219918000016	3
3	6	2	2	-6	4.75523594948977	0.621906300000034	3
4	6	2	2	6	4.71702275655658	0.658596599999859	3
5	6	2	2	-6	4.33144006089154	0.935140375500009	3
6	6	2	2	6	4.33170390980001	0.977981847999946	3

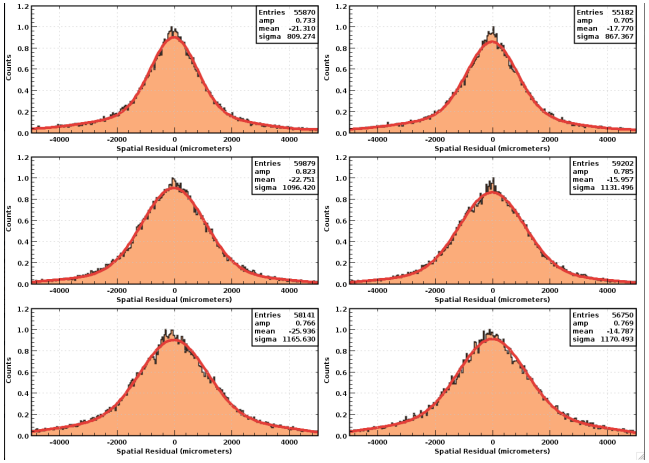
Showing 1 to 6 of 6 entries First Previous 1 Next Last

Test files for reconstruction:

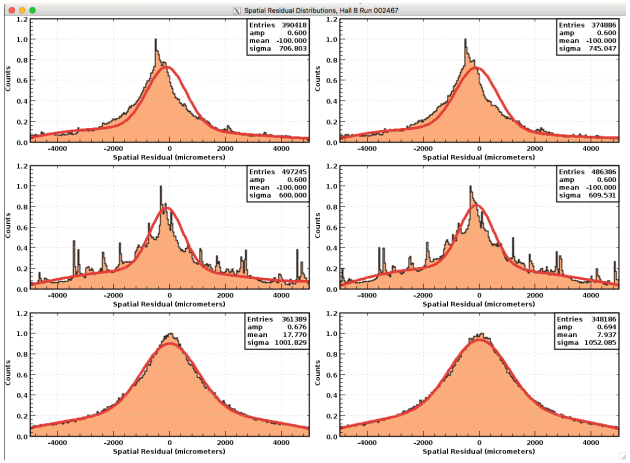
/volatile/clas12/thayward/drift_chambers/reconstruction/straight_track_runs/input/

- https://github.com/tbhayward/Clas12_DC_alignment/blob/master/groovy_scripts/residuals.groovy

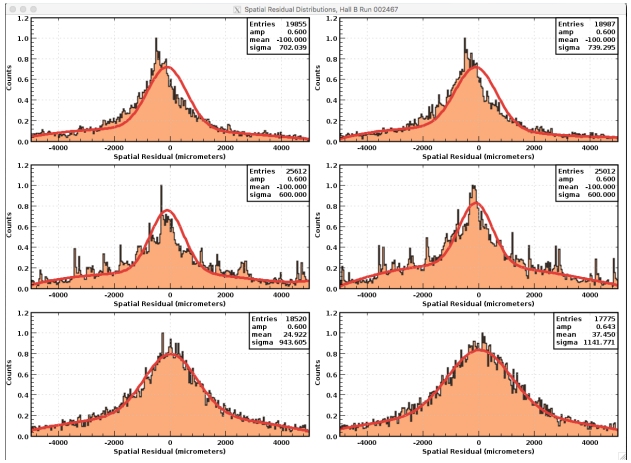
```
residuals.groovy
Arguments:
0 - directory with hipo files to analyze (must be given),
1 - number of files to analyze (if not given assumes all),
2 - minimum theta of particle track to allow (if not given, assumes 0 degrees)
3 - maximum theta of particle track to allow (if not given, assumes 90 degrees)
4 - int 1 (sector vs superlayer plots) or int 2 (sector vs layer plots)
```



Cooked calibration data



5c.3.4 Reconstruction: default variation



5c.3.4 Reconstruction: “test_align”, May 2018 engineers

To Do

- Determine the cause of the strange behavior in superlayers 1-2, 3-4.
- Investigate residuals as a function of angles (already scripted! Just needs to be done)
- Create method for saving residual “data” to use to fit as a function of changes in the variation table.
- Minimize this fit.
- Run reconstruction of full-field data and determine weight to assign to elastic peak.