

ALICE T0 Alignment Detector Algorithm and Preprocessor



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ALICE Offline week



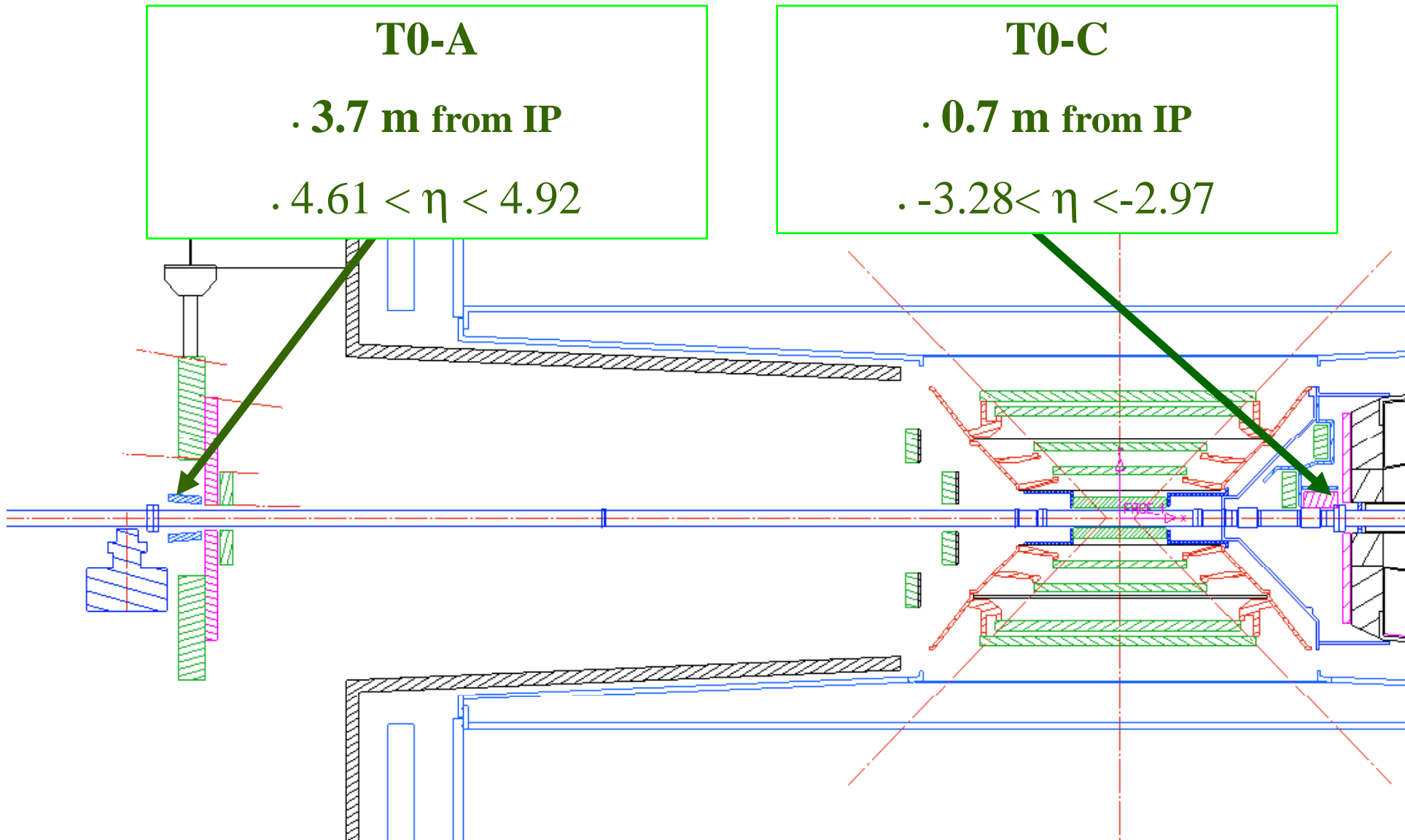
Outline

- ◆ ***Introduction***
- ◆ ***Alignment***
 - ◆ ***Survey data into alignment objects***
 - ◆ ***Awareness for simulation and reconstruction***
- ◆ ***T0 Detector Algorithms***
- ◆ ***T0 preprocessor***
 - ◆ ***DAQ data***
 - ◆ ***DCS data***
 - ◆ ***OCDB & Ref. DB output***
- ◆ ***Conclusions***





T0 arrays in ALICE





T0 Alignment

- Survey data to alignment objects
- Surveys
- Misalignments
- Alignment awareness



Survey data into alignment object

- ◆ MakeT0SurveyAlignment.C :

- ◆ Fill() method missing (files from GRID)

```
AliSurveyObj * s1 = new AliSurveyObj();  
//s1->SetGridUser("");  
//s1->Fill("V0", 835615, md);  
s1->FillFromLocalFile("~/survey/T0-C.txt", md);
```

- ◆ Units

```
if (0 != s1->GetCoordSys().CompareTo("ALICEPH") || 0  
!= s1->GetUnits().CompareTo("m")) { Printf("ERROR: Invalid  
Coordinate System or Units for use with this  
macro.");
```

- ◆ Read data from survey (GRID)

- ◆ Calculate x,y,z for T0

- ◆ Create AliAlignObj

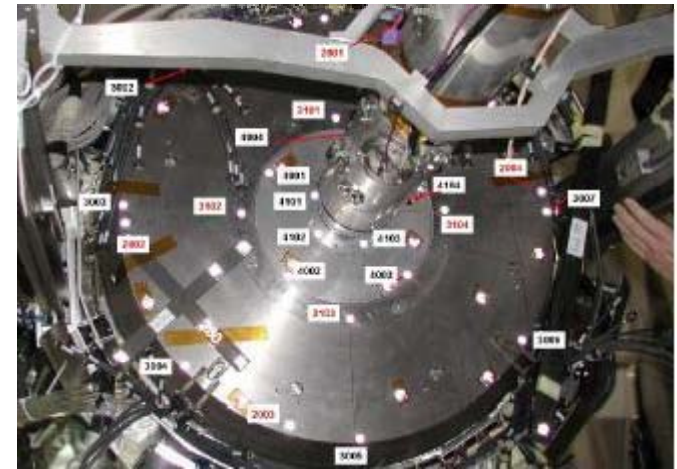
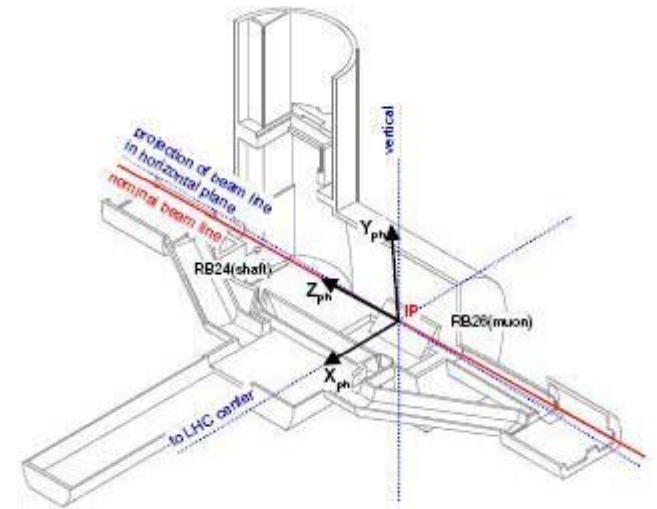
- ◆ Store AliAlignObj to OCDB



T0 surveys

T0 position w.r.t. Global Reference System

- **T0-C:**
- **EDMS number: 791504 (November 2nd, 2006)**
- **F0_Centre [m]: (0.0024, -0.0002, -0.7842)**
- **EDMS number: 835615 (April 10th, 2007):**
- **Session 3: 'z' coordinate**
- **Session 7: 'x', 'y' coordinate [mm]: (0.02, -0.31)**
- **T0-A**
- **support structure survey expected in 2 weeks**





Residual & Full misalignments vs. survey data

- **MakeT0ResMisAlignment.C and MakeT0FullMisAlignment.C:**
 - ❖ **max shift in cm w.r.t. Global RS:**
Double_t sigmatr = 0.05
 - ❖ **max rot in degrees w.r.t. Global RS:**
Double_t sigmarot = 0.3
- **T0-C survey: 0.002, -0.031 [cm]**



T0 Alignment-awareness

- Simulation: OK

- AliSimulation sim;

- `sim.SetSpecificStorage("T0/Align/*", "local:///.../CDB");`

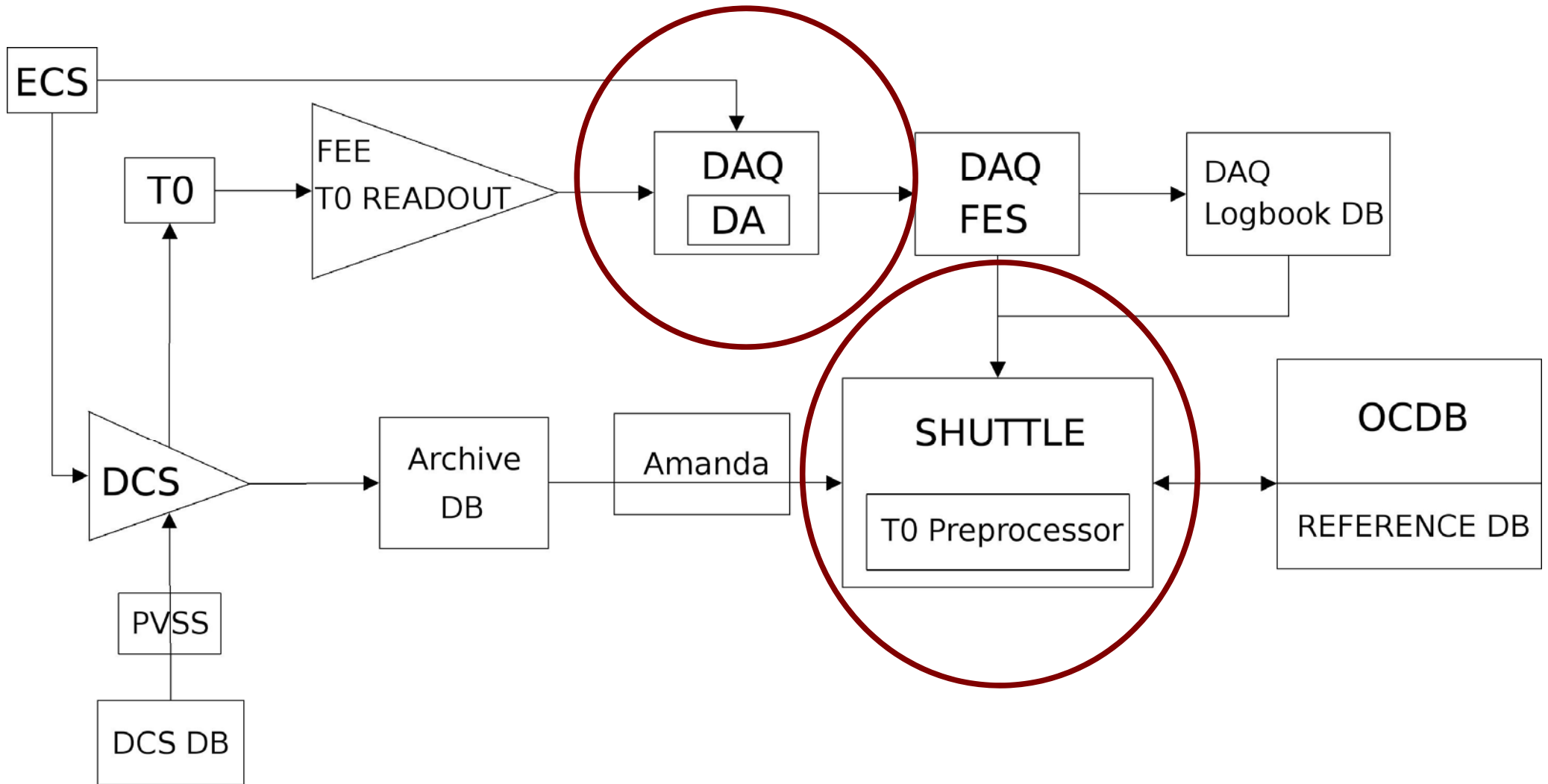
- `sim.SetLoadAlignData("T0")`

- Reconstruction:

- ongoing

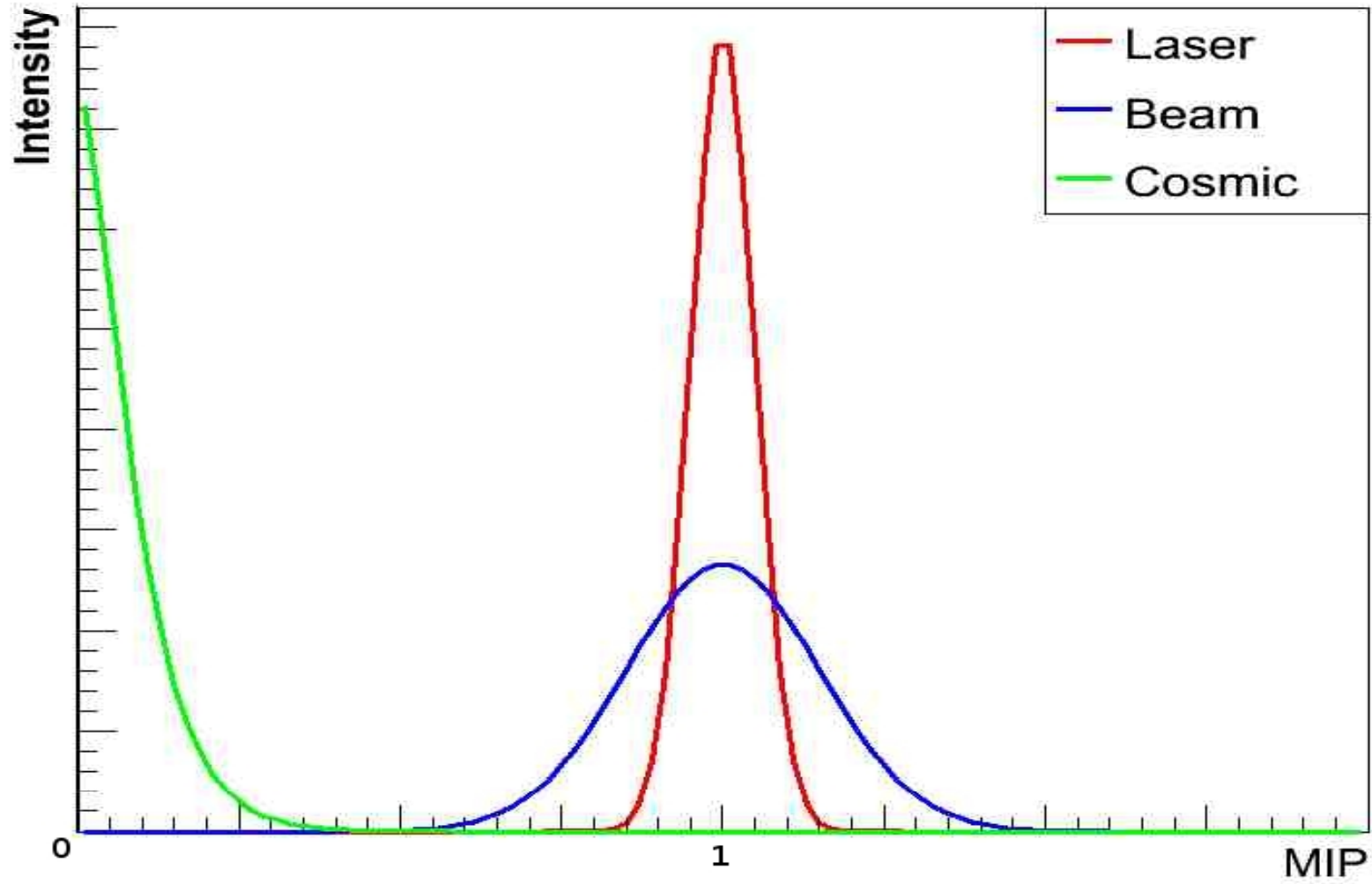


T0 Data flow





T0 signal





DA code

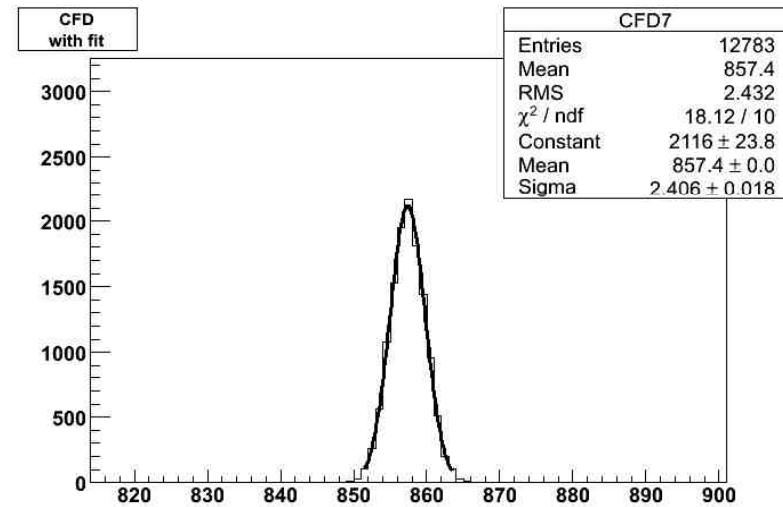
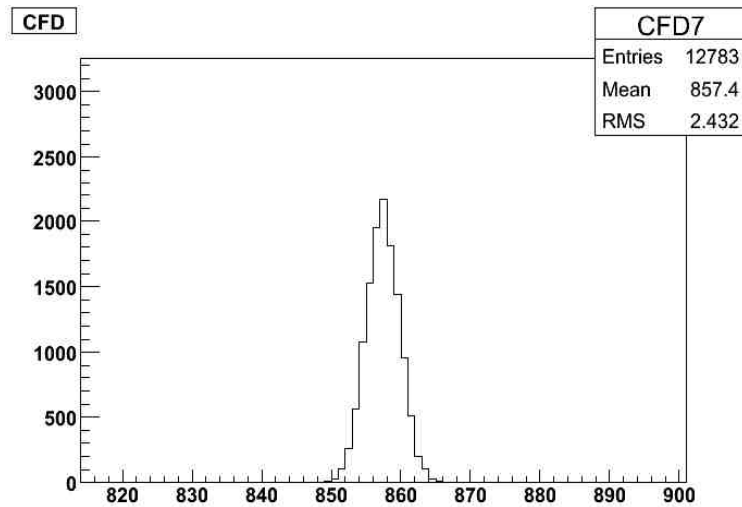
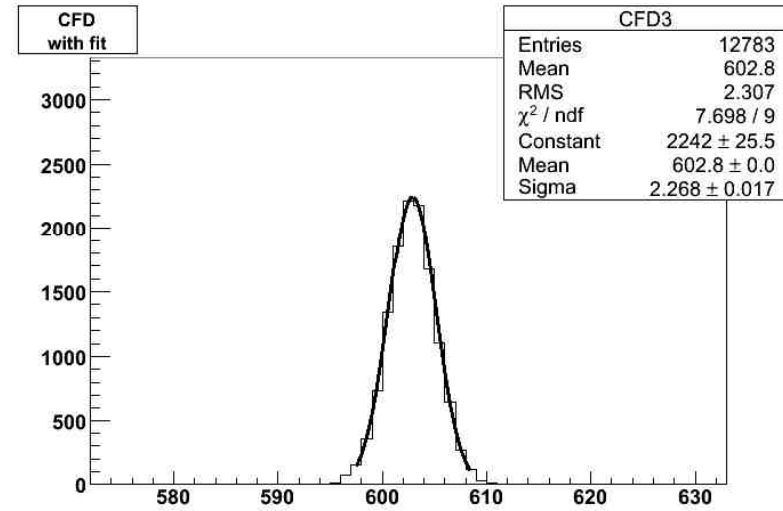
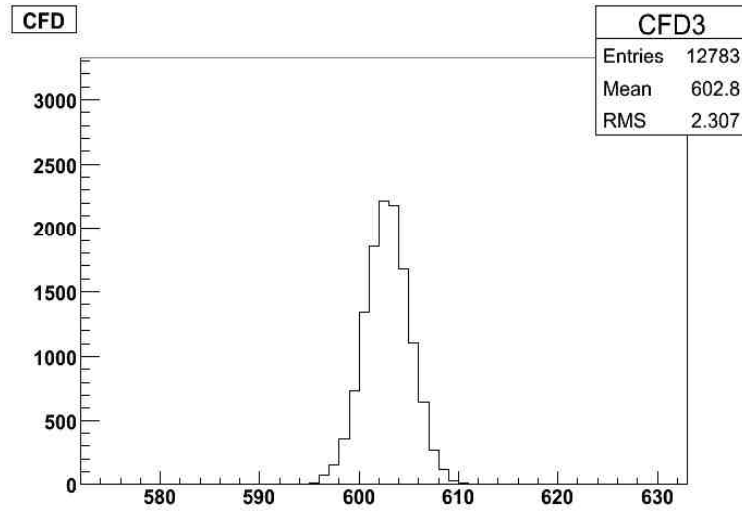
- T0 Reader
- Fitting function (fitv2DA)
 - ***TSpectrum *s = new
TSpectrum(2*npeaks);***
 - ***Int_t nfound = s-
>Search(hist[ii],2,"goff",0.05);***
 - ***Float_t *xpeak = s->GetPositionX();***



T0 Detector Algorithms

from DAQ

DA





DA Output

Const	Mean	Sigma	LBOrder	RBOrder
208.519577	488.061279	1.095009485		492
214.234131	588.092468	1.062664585		591
198.837311	688.103882	1.117700685		692
203.558609	787.999084	1.174603784		792
224.595673	887.961792	0.986561885		891
197.683228	988.079956	1.142206984		992
185.755066	1087.995117	1.2037391084		1092
214.245590	1188.017212	1.0755521185		1192
214.991608	1287.993286	1.0491591285		1291
209.180023	1387.961670	1.1331701385		1392
196.749359	1488.180054	1.1632281485		1492
200.290146	1588.053101	1.1040701585		1592
121.139816	1687.833740	1.2843661684		1692
114.697922	1787.926392	1.3016391784		1793
128.944794	1887.924072	1.2547191884		1892
120.143730	1987.819824	1.2082961984		1994
117.429993	2087.956299	1.2329372084		2094
125.942017	2187.917969	1.2740452184		2192
127.705276	2287.862549	1.2811862284		2293
149.499512	2387.846924	1.0823532385		2392
126.205620	2487.964844	1.2483532484		2492
123.680038	2587.885498	1.2695292584		2592
127.925919	2687.685303	1.1979552684		2693
134.879654	2787.962891	1.1487312785		2792



DA output's destination (via preprocessor)

- To OCDB:
 - fit of equalized channels
- To Reference DB:
 - fit of LED-CFD
 - fit of QTC2-QTC1
 - CFD, LED, QTC histograms

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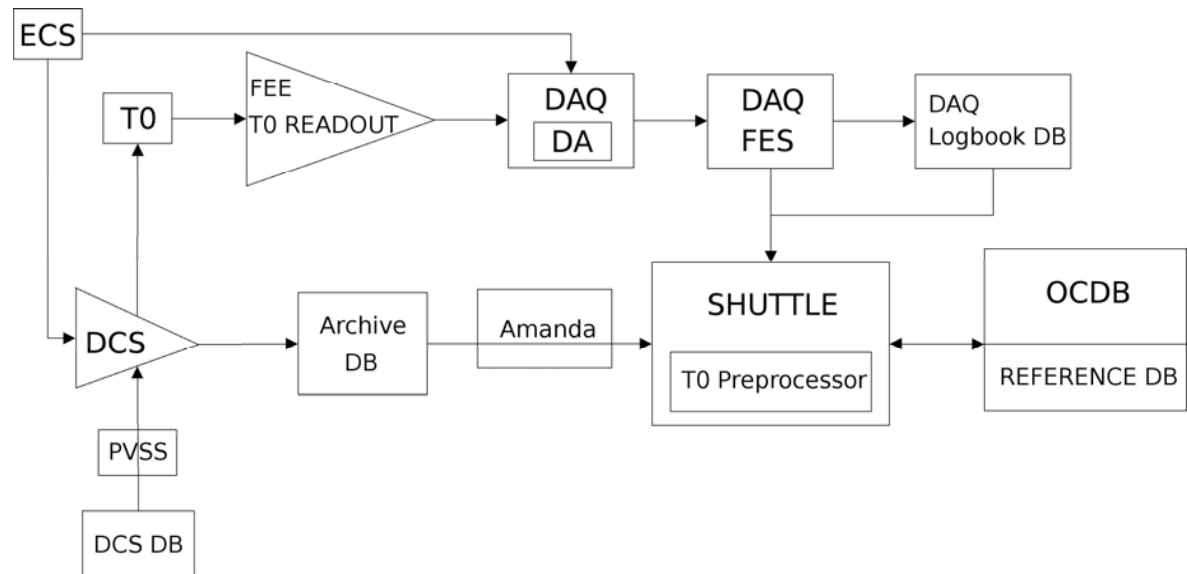


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T0 Preprocessor

- Input
 - DAQ
 - DCS
- Cross-check:
 - return codes
- Send data to:
 - OCDB
 - ReferenceDB





T0 classes for OCDB and Reference DB

- AliT0CalibLaserData
 - Stand-alone
- AliT0online OCDB
 - physics
- AliT0onlineRefDB
 - physics



T0 DCS Data Points

DCS alias	N of channels	Data type	Unit	Value	% fluctuation	Update Frequency (s)
t00_a_hv_imon_[0..11]	12	float	uA	83	0.9	300
t00_a_hv_vmon_[0..11]	12	float	V	1325	0.85	300
t00_a_lv_imon_[0..1]	2	float	uA	83	0.9	300
t00_a_lv_vmon_[0..1]	2	float	V	6	0.15	300
t00_c_hv_imon_[0..11]	12	float	uA	83	0.9	300
t00_c_hv_vmon_[0..11]	12	float	V	1325	0.85	300
t00_c_lv_imon_[0..1]	2	float	uA	83	0.9	300
t00_c_lv_vmon_[0..1]	2	float	V	6	0.15	300
t00_a_cfd_thre_[0..11]	12	float	V	0.5	10	300
t00_a_cfd_walk_[0..11]	12	float	V	-0.1	10	300
t00_c_cfd_thre_[0..11]	12	float	V	0.5	10	300
t00_c_cfd_walk_[0..11]	12	float	V	-0.1	10	300
t00_ac_scaler_[0..31]	32	float	1/s	$3 \cdot 10^8$	50	300
t00_ac_trm_[0..19]	20	float	C°	35	3	300
t00_ac_drm	1	float	C°	35	3	300



T0 Preprocessor code

AliT0Preprocessor

```
UInt_t AliT0Preprocessor::Process(TMap* dcsAliasMap )
//DCS
TString aliasName =Form("...", j);
aliasArr = dynamic_cast<TObjArray*> (dcsAliasMap->GetValue(aliasName.Data()));

//DAQ
const char* TimefileName = GetFile(kDAQ, "TIME", "LDC0");
//Calculations

// Put CFD to OCDB
UInt_t result = Store("Calib","Data", calibdata, &metaData);

// Put all other results to Reference DB
StoreReferenceData
StoreReferenceFile

AliT0Calc
AliT0onlineOCDB
AliT0onlineRefDB
(AliT0Dqclass)
```



Conclusions

- T0 alignment
 - survey data into alignment objects
 - awareness for reconstruction
- T0 DA
 - available in AliRoot since April 2007
 - works with simulated and real data
 - rewritten to fulfil current requirements
- T0 preprocessor
 - available in AliRoot since October 2006
 - undergoes improvement to fulfil current requirements