

TOF status report

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TOF: to do list

http://pcaliproject.cern.ch/alice/index.php?m=tasks&a=view&task_id=135&open_task_id=906

Child Tasks		Files			
Pin	Log	P	Work	Task Name	
		Log		Calibration (906)	
		Log		... Implementation of a new calibration object for HV to be used in Reco (2448)	
		Log		Raw Data (942)	
		Log		Quality Assurance (1395)	
		Log		... Reference distribution (2324)	
		Log		... Implementation of run type (2450)	
		Log		... Implementation of simulation in QA checker (2451)	
		Log		... Implementation of reconstruction in QA checker (2452)	
		Log		... Implementation of reference data (2453)	
		Log		Geometry (1407)	
		Log		Simulation (1412)	
		Log		... Verification of time window value in simulation (2444)	
		Log		... Verification of the event merging procedures (2445)	
		Log		... Verification of the embedding procedures (2446)	
		Log		Reconstruction (1413)	
		Log		... Implementation of a new parameter (AliTOFclusterfinder) in Reco Param objects (2447)	
		Log		Material Budget (2358)	
		Log		Trigger (2374)	
		Log		... Implementation of the code for trigger parameters for the simulation of the trigger input to the CTP (2449)	

Simulation (1)

1. Time information in simulation (needed for pileup sim and more realistic detector response)

1) Time stored in the TOF hit objects

- When a charged Geant particle crosses a TOF sensitive volume, it leaves a TOF hit. The time information recorded in TOF hit is the Geant time, i.e. the time-of-flight of the particle that gave TOF hit.

2) TOF (s)digit time

- The TOF (s)digit time information is the TOF hit time (i.e. the Geant time) smeared per the TOF time resolution.
- This parameter (as the MRPC^(*) detection efficiency and the time-over-threshold measurement) depends on the TOF hit position in the pad area (as well know by test beam results). At the sdigitization step, per each hit ,we evaluate the TOF time resolution according to its pad position. (We take into account the edge effects also, according to the test beam results.).

3) Time/matching window value (task 2444)

- At (s)digitization level, we did not cut on the matching window; we had this cut in the Digits2Raw transformation. With the R31365, I inserted this cut also at sdigitization level. The matching window value has been set to ~200ns.

(*) Multigap Resistive Plate Chamber = TOF detector element

Simulation (2)

2. labels: are the labels from the kinematics tree correctly propagated to hits, sdigits, digits?
 - Yes, they are. We have one label per each TOF hit and the same for the TOF sdigits. At digitization step, per each TOF pad, we 'sum' in one digit all the sdigits (3 is the allowed maximum number) which time informations are 'equal' in a defined dead time window. Then, 3 is the maximum number of label allowed per digit.
 - Probably the problem reported in the following bug ([#47098: index out of bound in TOF Digitization](#)):
I-AliTOFDigitizer::CreateDigits: in digitizer, create digit
E-TArrayI::operator[]: index 1 out of bounds (size: 1, this: 0xcc042400)
is due to a tracks number with the same TOF measurement greater than the maximum value, i.e. 3. This is to be controlled.

Simulation (3)

3. embedding: is the track embedding foreseen in your detector? If yes, is it working correctly? (task 2446)
 - I found that the Raw2SDigits method had not been implemented for the TOF detector. I recently implemented (R31362). It seems to me that it works fine. To check this code I am using the package located in the directory `$ALICE_ROOT/test/embedding`. For the moment, I have not got a statistically significant number of events...It is only one...

Anyway, I see:

- | | |
|-------------------|--|
| digits | 1. SIGNAL: 3 reconstructed tracks matched with a TOF measurement (3 good matched and 0 bad matched); |
| raw | 2. BACKGROUND: 2088 reconstructed tracks matched with a TOF measurement (1959 good matched and 159 bad matched); |
| digits+raw | 3. MERGED: 2152 reconstructed tracks matched with a TOF measurement (2 good matched and 2150 bad matched). |

Raw Data

- is the raw data format already fixed, or additional changes are needed?
 - Yes, it is fixed. Only an addition: in the TOF readout crates the OR signals -that are the TOF trigger signals- have been plugged; I will introduce an additional method in the TOF rawReader class to read these OR signals.

Reconstruction (1)

1. Implementation of a new parameter (currently in the `AliTOFClusterFinderV1` class) in `RecoParam` object (task 2447)
 - In the new TOF clusterizer algorithm, I defined a static variable (called `fgMaxDeltaTime`). If the difference between two time measurements (called t_1 and t_2) coming from two neighbouring TOF pads is less than `fgMaxDeltaTime`, t_1 and t_2 are two time measurements of the same particle, then they can be combined together to create a TOF cluster.
This parameter is still a static variable.

Reconstruction (2)

To avoid the risk to modify many times the AliTOFRecoParam class, I am scrutinizing the TOF code to find other possible parameters to be enumerated in between the TOF recoParams.

I found a new candidate in the TOF matching algorithm: it is a time offset introduced since from this class first implementation (13/04/2004) to 'align' in time the TOF measurements with the track lengths as reconstructed (overestimation).

Currently the offset value is 32ps.

Online Calibration

1. Implementation of a new calibration object for HV to be used in reconstruction (task 2448)
 - Currently, the HV values are only stored as reference to have the possibility in the future to take into account the (however weak) HV dependence of the MRPC detection efficiency, time resolution and time-over-threshold, as the test beam results shown.

Trigger Information

Implementation of the code for trigger parameters for the simulation of the trigger input to the CTP (task 2449)

1. information you may need to retrieve
 - After consulting the TOF trigger expert, we prepared a first list of parameters from which the TOF trigger can be affected: the FEA threshold voltages and the HV voltages.
2. system (DAQ/DCS/HLT) you may need to interact with to retrieve your information
 - DCS
3. procedures you may need to apply
 - Reading of TOF trigger parameters from DCS
 - Calculation of the expected trigger value according to the test beam results

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Quality assurance

- Reference distributions (2324)
- Implementation of run type (2450)
- Implementation of simulation in QA checker (2451)
- Implementation of reconstruction in QA checker(2452)
- Implementation of reference data (2453)

- Nothing has changed.

Quality assurance

- Thanks to the cosmic data analysis, G. Cara Romeo is updating the histogram list to fill. Here some of them:
 - Hit pad map: 2D histogram;
 - Fired FEA map: 2D histogram;
 - Fired TRM distribution: two 1D histograms, one per each side (A,C)
 - Time measurement vs fired DDL: 2D histogram;
 - Time-over-threshold vs fired DDL 2D histogram.

The image features a blue gradient background. The top edge is wavy, with a lighter blue area at the very top that transitions into a darker blue. The text "The end" is centered in a light blue, sans-serif font.

The end