

TOF code status

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Outline

- ▶ Simulation
- ▶ Reconstruction
- ▶ Trigger
- ▶ Savannah bugs
- ▶ Status of TOF code in v4-19-Release
- ▶ Status of TOF code in v4-20-Release
- ▶ QA and PWGI train status: see F.Bellini report on Wednesday

Simulation code update

- ▶ **Simulated more realistic TOF time:**
 - ▶ Update in sdigitizer code:
 - ▶ TOF time resolution from OCDB (TOF/Calib/RecoParams object);
 - ▶ Added a flag to simulate TOF time resolution constant on the whole TOF pad area: this flag by default for MC event simulations.
 - ▶ Updated methods to read and write OCDB/TOF/Calib/RecoParams object.
- ▶ **Simulate a more realistic event time:**
 - ▶ smearing according to the values observed in real data:
 - ▶ AliSimulation to be modified: C.Cheskov is working on (details in savannah bug #73877 - Interaction time in MC)

Reconstruction code update

- ▶ Added a new flag to AliESDtrack (kTOFmismatched)
- ▶ Removed TOF time offset tuned on old MC events
 - ▶ In the past it was needed to align TOF measurements to the overestimated integrated track length.
 - ▶ From our checks, it seems that the track length now is better estimated than in the past.
- ▶ Updated TOF combinatorial algorithm (F.Noferini):
 - ▶ It takes into account only good reconstructed tracks (!kTOFmismatched) to calculate event_times;
 - ▶ It has been tuned also on Pb-Pb collision data.

Reconstruction code update

- ▶ Event times (more than one to avoid TOF PID bias) as estimated with combinatorial TOF algorithm:
 - ▶ Defined a new TObject container, called AliTOFHeader;
 - ▶ Added an AliTOFHeader global variable in AliESDEvent class;
 - ▶ New method implemented in AliReconstruction and AliTOFReconstructor classes to
 - ▶ Calculate TOF event_times (done by AliTOFT0maker class)
 - ▶ Write TOF event_times, TOF event_time resolutions, TOF time resolution (from TOF OCDB) and event_time spread (from GRP) in the ESD header before to make TOF PID.
- ▶ Defined AliTOFReconstructor::FillESD method (R.Preghenella) –rev44983-:
 - ▶ To (empirically) correct the calculated integrated times; it aims at improving of TOF performance at low momentum where the integrated times are observed to deviate from TOF measurements.

Reconstruction code update

- ▶ Updated AliTOFPIDResponse and AliTOFpidESD classes (F.Noferini):
 - ▶ When we make PID per each matched-TOF track, we have to take into account the best event_time estimate, i.e. the T0 detector measurement or the one(s) estimated by the TOF combinatorial algorithm.

Trigger

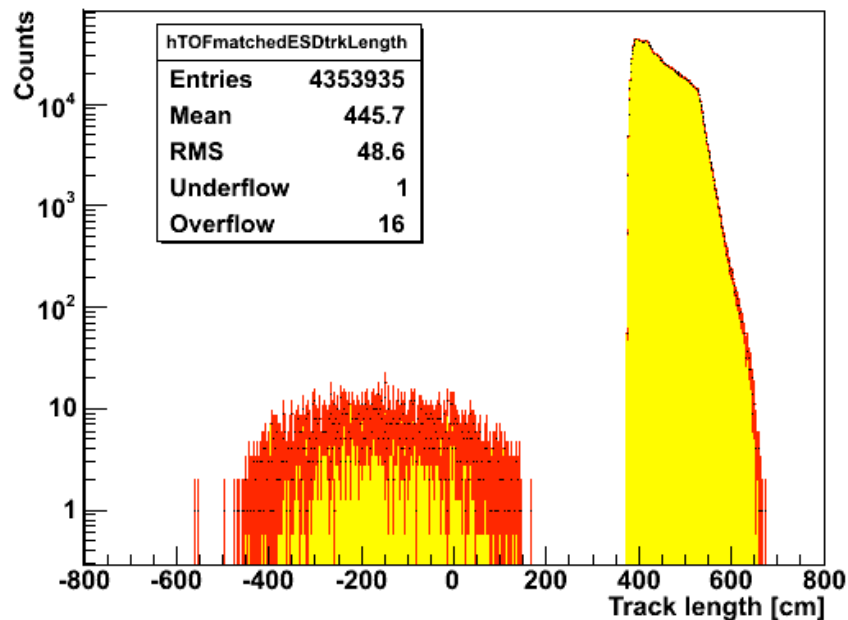
- ▶ **TRIGGER PreProcessor update**
 - ▶ store a new object containing the relevant information about TOF trigger status for each run in the OCDB (rev44711, 44740);
 - ▶ added a protection to TOF PreProcessor in order to handle correctly the runs which have no calibration triggers. Negligible impact on the quality of the reconstruction (45045)
- ▶ **Added default object for TOF Trigger Mask in Trigger OCDB (rev44911);**
- ▶ **Read the active trigger mask from the OCDB (rev45058, 45071 and 45327)**
 - ▶ Without these revisions the code used for the simulations of PbPb collisions will assume 100% efficiency for the TOF trigger instead of the realistic efficiency as stored in the trigger OCDB parameters.

Savannah bugs affecting reconstruction

- ▶ [#75196](#) REquest to port trunk rev 45338 in the release v-19, v-20
 - ▶ optimization of T0-TOF algorithm for high multiplicity events (rev45338)
- ▶ [#74809](#) request to port trunk rev. 44983 in the Release (integrated times correction)
 - ▶ empirical correction to the integrated times: to improve TOF performance at low momentum where the integrated times are observed to deviate from TOF measurements. For the time being the parameters used for this correction are stored in a file in AliRoot.
- ▶ [#74151](#) Important update in AliTOFPIDResponse class: use also T0 detector information to make Time-Of-flight PID
 - ▶ Very long discussion.
- ▶ [#74499](#) Error message during TOF reconstruction
 - ▶ Found the origin. New OCDB/TOF/Calib/RecPar objects to be added. To be noted that this OCDB repository is not used anymore. It is there for backward compatibility.
- ▶ [#73873](#) Track length: small and negative values for matched TOF-tracks
 - ▶ See next slides

Negative integrated track length

Matched ESDs tracks length



- ▶ The tracks with reconstructed length less than 2m (and negative values also) constitute the 0.08% of the whole set.
- ▶ Since these tracks have the flags `AliESDtrack::kTIME` and `AliESDtrack::kTOFout` (`AliESDtrack::kTPCout` included) switched on, they are good candidate to make TOF PID.

Negative integrated track length

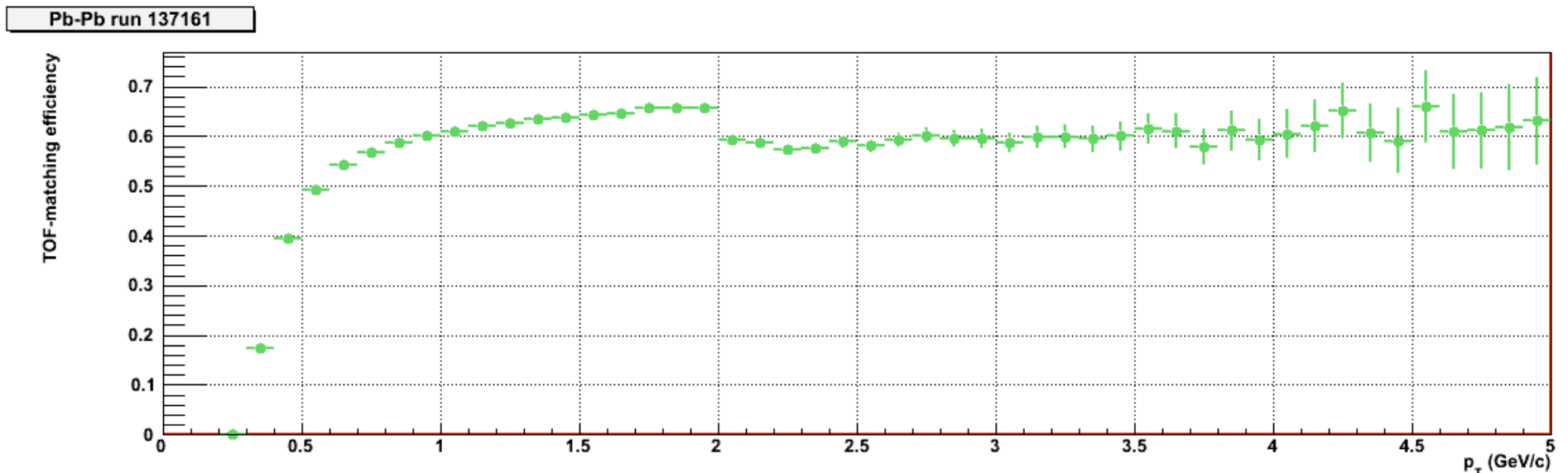
- ▶ Y.Belikov found a possible source for this problem in AliTOFtracker class.
- ▶ S.Arcelli suggested to remove lines 649-656.
- ▶ I tried to locally check this change.
- ▶ I focused on run 115318. I need to reconstruct at least one chunk of this run.
- ▶ I haven't been successful when I taken into account rec.C file used for official reconstruction; if TRD removed from detector list, reconstruction works.
- ▶ Work in progress

Savannah bugs affecting trigger

- ▶ [#74868 request to port trunk rev. 45045 in the Releases \(calibration trigger protection\)](#)
 - ▶ To fix small perturbations in some TOF trigger OCDB parameters (sometimes no calibration triggers sent by CTP during a physics run). Rev45045 will fix this small issue related to the missing calibration triggers.
- ▶ [#74882 request to port trunk rev. 45058 and rev. 45071 in the Releases \(TOF TRIGGER info from OCDB\)](#)
 - ▶ Without 45058, 45071 and 45327 revisions the code used for the simulations of PbPb collisions will assume 100% efficiency for the TOF trigger instead of the realistic efficiency as stored in the trigger OCDB parameters. Crash fixed.
- ▶ [#66146 Very large memory allocation in TOF](#)
 - ▶ In principal, fixed: object read from OCDB/TOF/Calib/ParOffline repository converted from TObjArray of AliTOFChannelOffline in a new object of AliTOFChannelOfflineArray. Code not tested. However, it needs to change also calibration procedure to write the new object in TOF OCDB.
- ▶ [#74368 Worrying message from TOF in simulation](#)
 - ▶ Converted AliWarning in AliDebug message.
 - ▶ Proposal: enhance the number of allowed track label attached to the digits, as well as to clusters and reconstructed tracks.

Potential new savannah bug

- ▶ TPC-TOF matching efficiency appears to have a step at $p_T=2$ GeV/c (R.Preghenella).
- ▶ Probably related to TRD tracker



Status of TOF code in v4-19-Release

- ▶ Many of the changes related to the trigger are already inside this release.
- ▶ For that moment, the MC event simulations don't contain real information about TOF trigger efficiency because revisions 45058, 45071 and 45327 are not inside.
- ▶ It should be important to port these changes in first physics release to have the right normalization when TOF contributed to the trigger.

Status of TOF code in v4-20-Release

- ▶ As for release v4-19-Release for what concerns TOF trigger code.
- ▶ From the reconstruction point of view, now we have all changes inside v4-20-Release.
- ▶ When ready for pass2 of reconstruction, we would like to use this release, because it contains all important improvements (TOF event_time estimate as well as best choice for event_time) for the best (at moment) TOF PID.

The end