Photon veto status report

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NA62 Italia workshop
06/11/2024

LAV station efficiencies vs channel

Efficiencies evaluated for MIPs in the beam halo. Difference due to a bias in selection
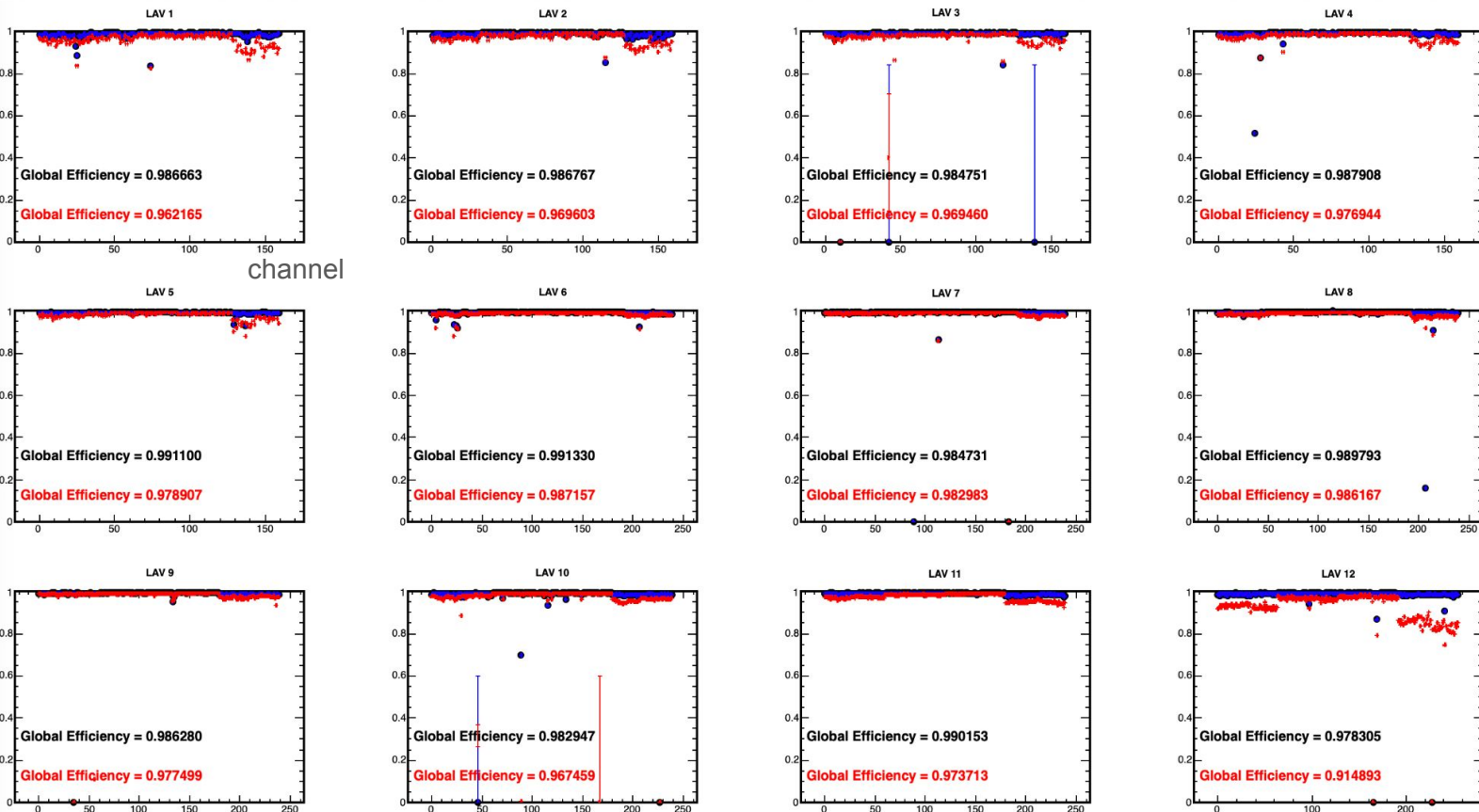
Muon run
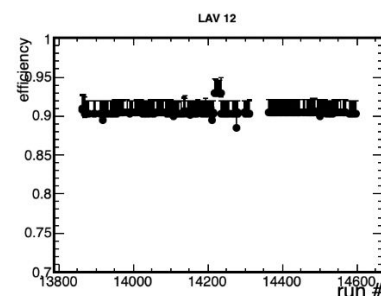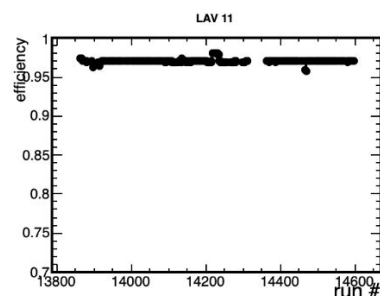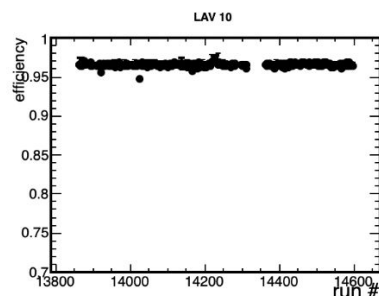K run 14595

Dead ch:
LAV3 10
LAV7 183
LAV9 35
LAV10 227
LAV12 165
LAV12 227

LAV stability of the efficiencies vs run number (Coarse T0)
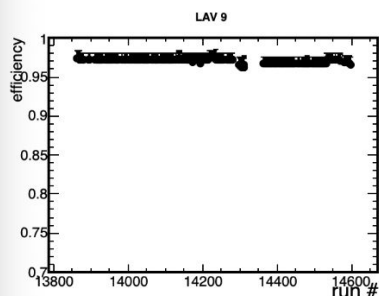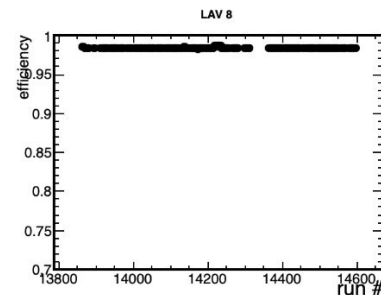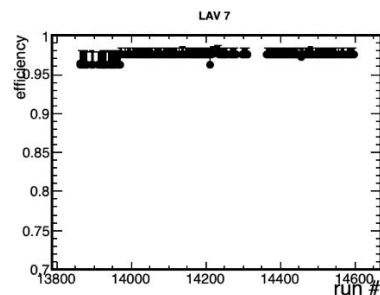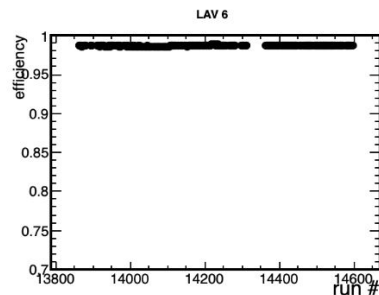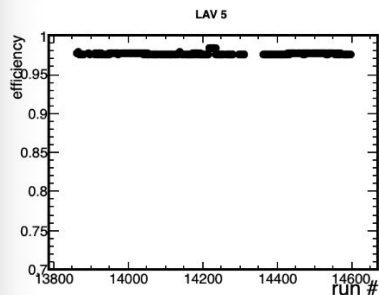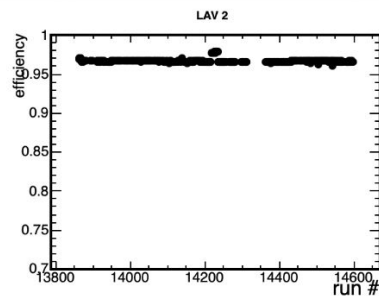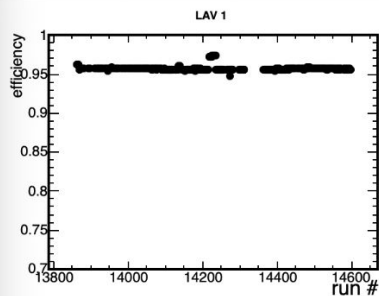
LAV Hardware interventions

- During 2024 run:
  - 2x A4528 crate controller CPUs replaced
  - 3x A1536N HV boards replaced
  - A noisy channel fixed due to a loose connector

- Planned interventions before 2025 run:
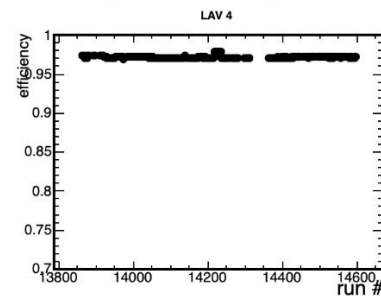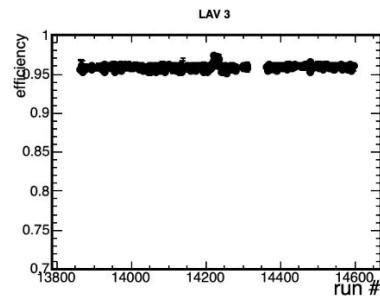 - LAV9 ch 55 PMT keeps drawing high current at intermittent times: it should be investigated during the winter shutdown
  - Retuning of HV mainly for noisy channels

Foreseen LAV calibration software improvements

- We have a dependence of the T0s from the particle type (dependence on hit edge mask combination, trigger mask have been studied)
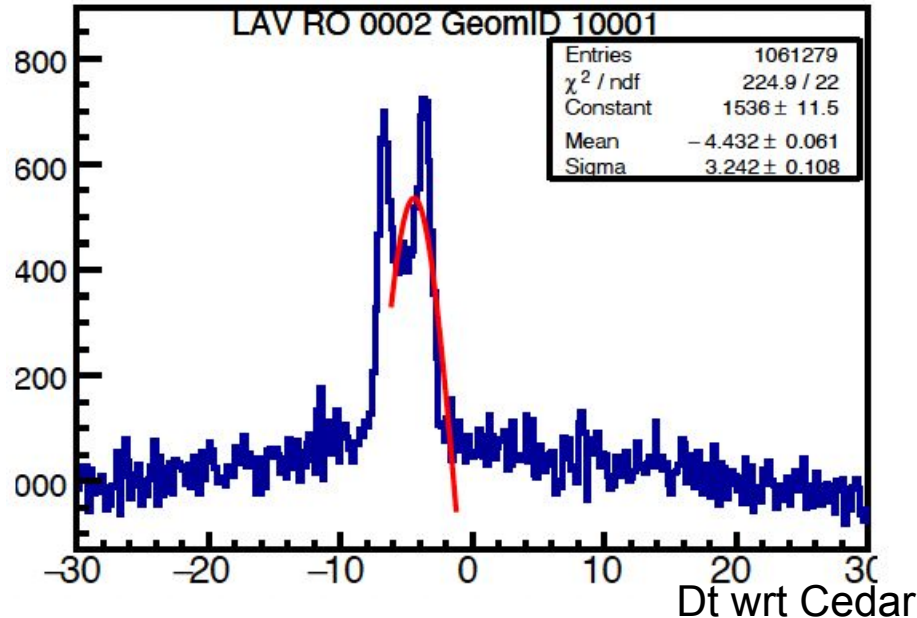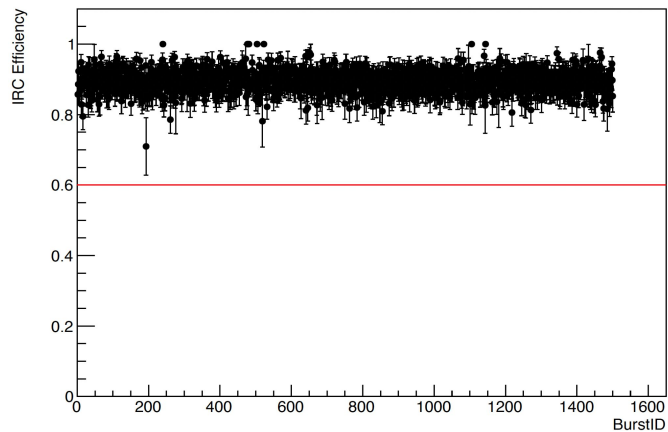- We want to improve the T0 finding procedure to better align on photons: ongoing study

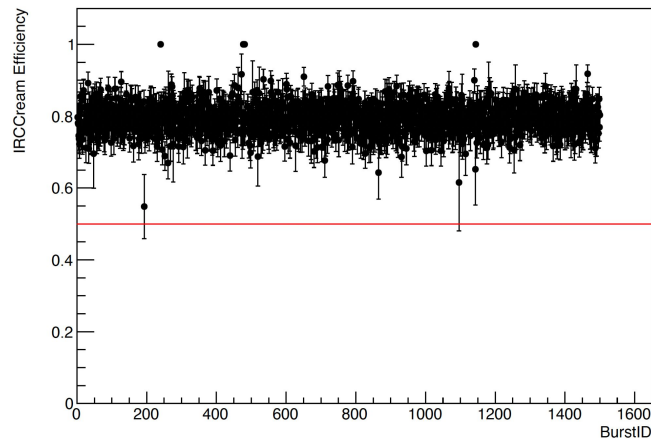Example of LAVT0 fit from run 14595.

One of worse cases. The two peaks are due to different particle types.
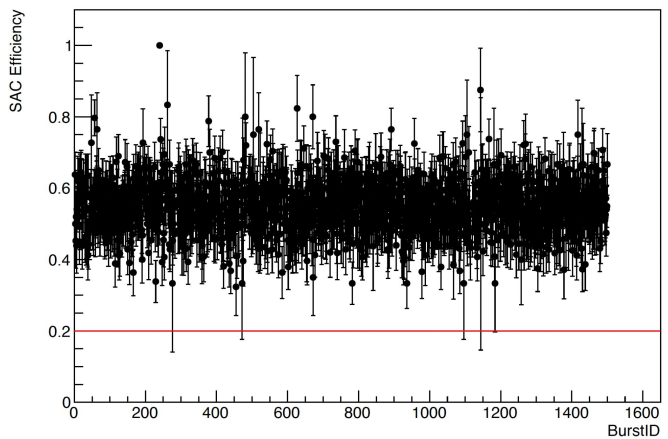
IRC and SAC efficiencies
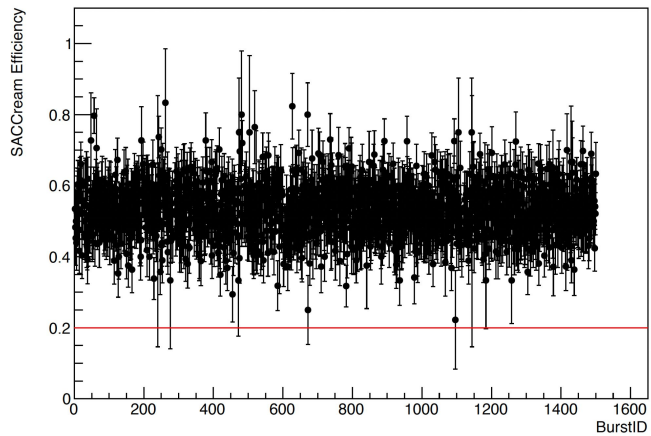

IRC efficiency Vs BurstID for run 14595

IRCCream efficiency Vs BurstID for run 14595
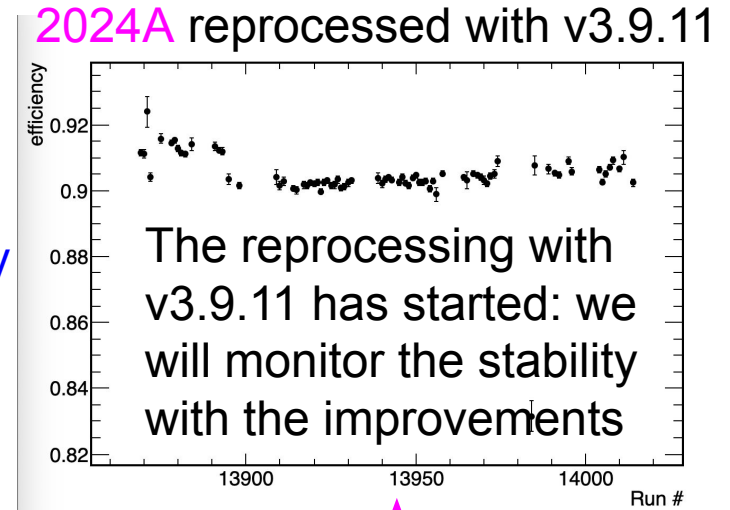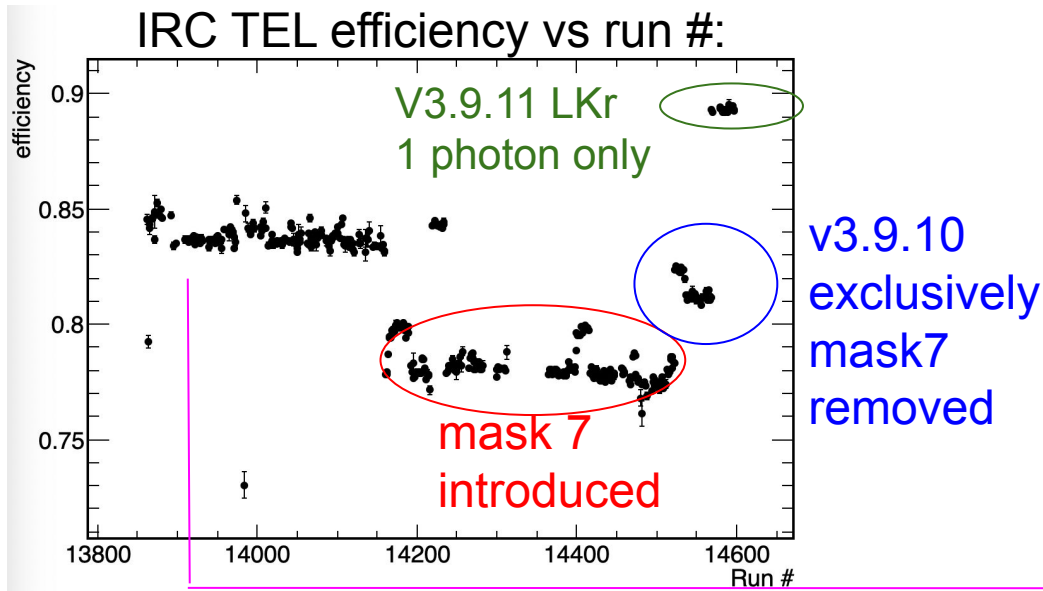
SAC efficiency Vs BurstID for run 14595

SACCream efficiency Vs BurstID for run 14595

IRC/SAC DQ software improvements

- The DQ IRC/SAC/SAV efficiency has a bias vs the trigger masks used in the computation
- When mask7 was introduced this bias became clearly evident
- Since v3.9.11 the bias has been mitigated by asking that the LKr has at most 1 photon cluster (such to have the other photon in the IRC/SAC)
- The efficiency stability between start and end run needs to be checked

IRC TEL efficiency vs run #:

V3.9.11 LKr
1 photon only

v3.9.10
exclusively
mask7
removed

mask 7
introduced

2024A reprocessed with v3.9.11

The reprocessing with v3.9.11 has started: we will monitor the stability with the improvements

Conclusions

- We are happy with LAV, IRC, SAC and SAV performance

- We do not plan any major hardware intervention but mainly maintenance

- We foresee some software calibration and calibration work for the photon vetoes

Spare slides

LAV stability of the efficiencies vs run number
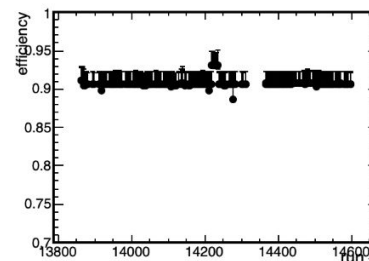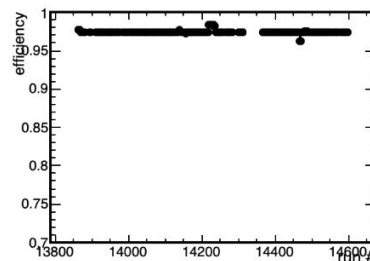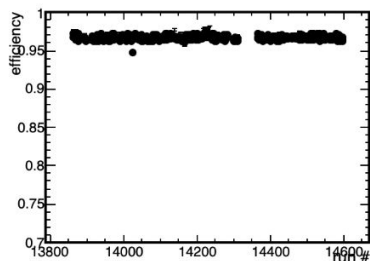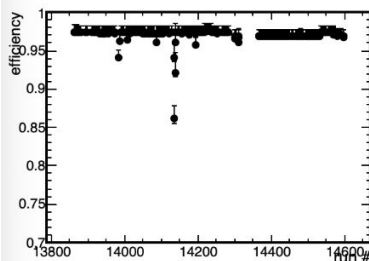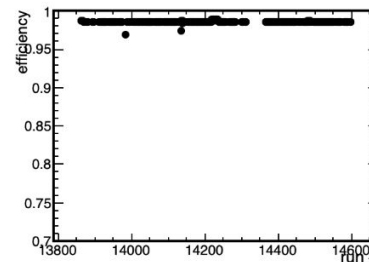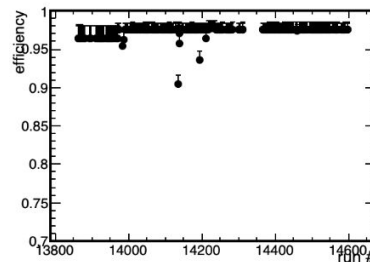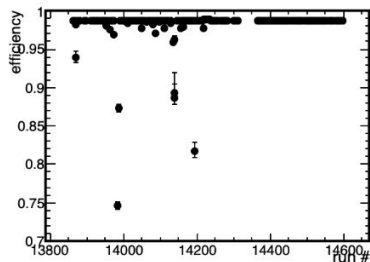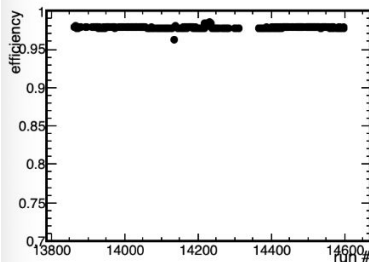
LAV Hardware interventions during the 2024 run

- A4528 crate controller CPU replaced for LAV4 (May 4th)
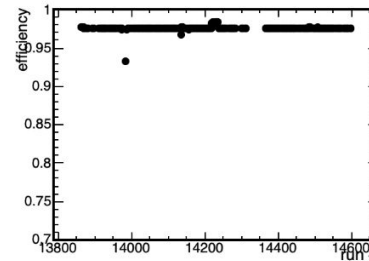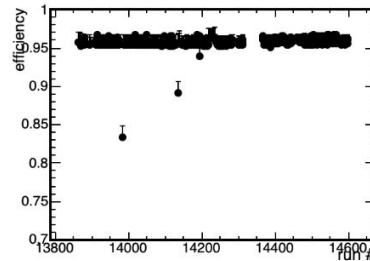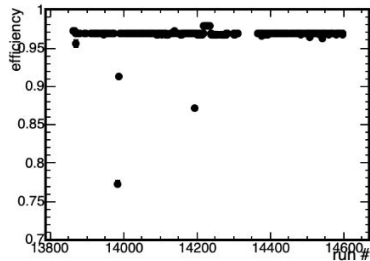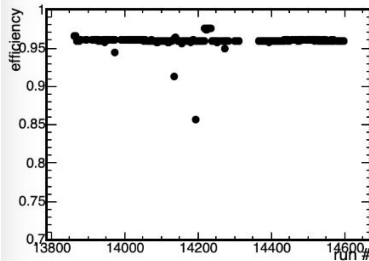- A1536N HV board replaced for LAV 3 slot 4 (June 22nd)
- A1536N HV board replaced for LAV 12 slot 14 (July 8th)
- Noisy channel due to a loose connector connection (July 17th)
- A4528 crate controller CPU replaced for LAV4 (Sept 10th)
- A1536N HV board replaced for LAV12 slot 11 (Oct 8th)

- LAV9 ch 55 PMT keeps drawing high current at intermittent times: it should be investigated during the winter shutdown

LAV DQ & calibration software improvements

- Dependence of the T0s from the particle type has been observed
- After applying slewing corrections the difference is reduced, as the edge masks also depend on the particle type
- We want to improve the T0 finding procedure to align on photons

RecoHitTimeWrtReferenceVsT0TLow_mip

Entries	76918
Mean x	−2.9
Mean y	41.79
Std Dev x	3.182
Std Dev y	11.02

MIP from Candidate

RecoHitTimeWrtReferenceVsT0TLow_photon

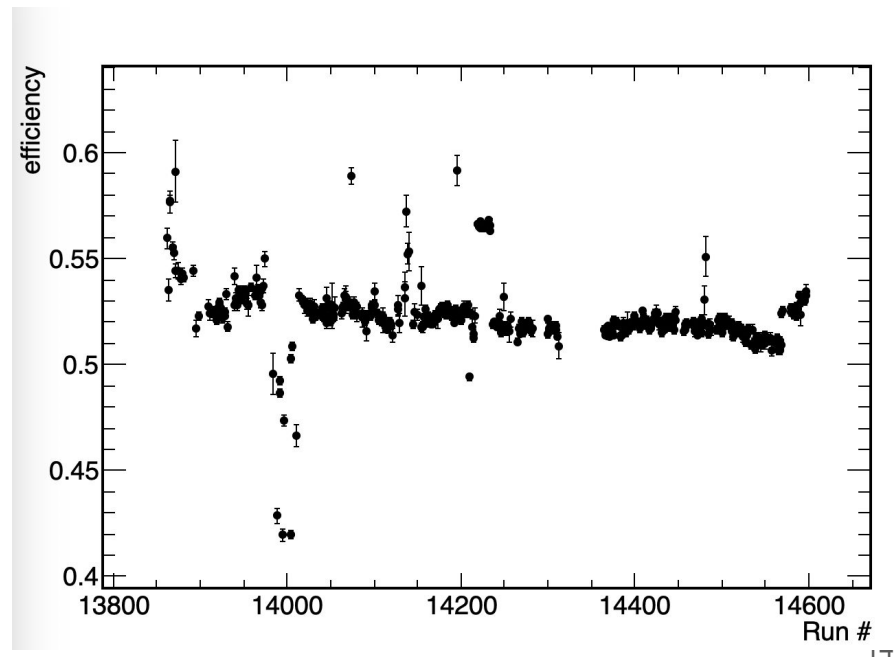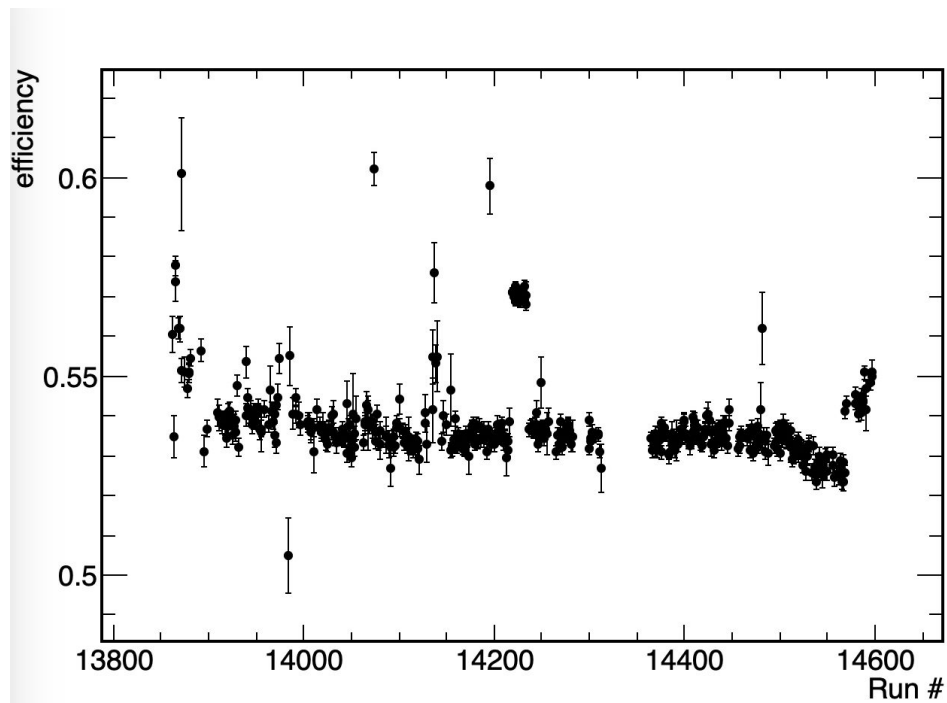| Entries	50048
Mean x	−2.234
Mean y	53.22
Std Dev x	3.14
Std Dev y	14.54

shower from Candidate
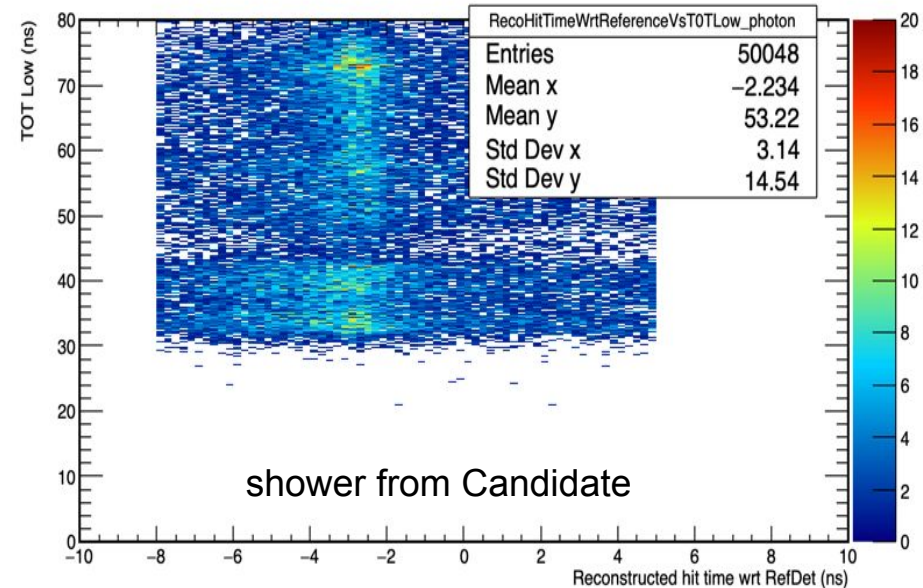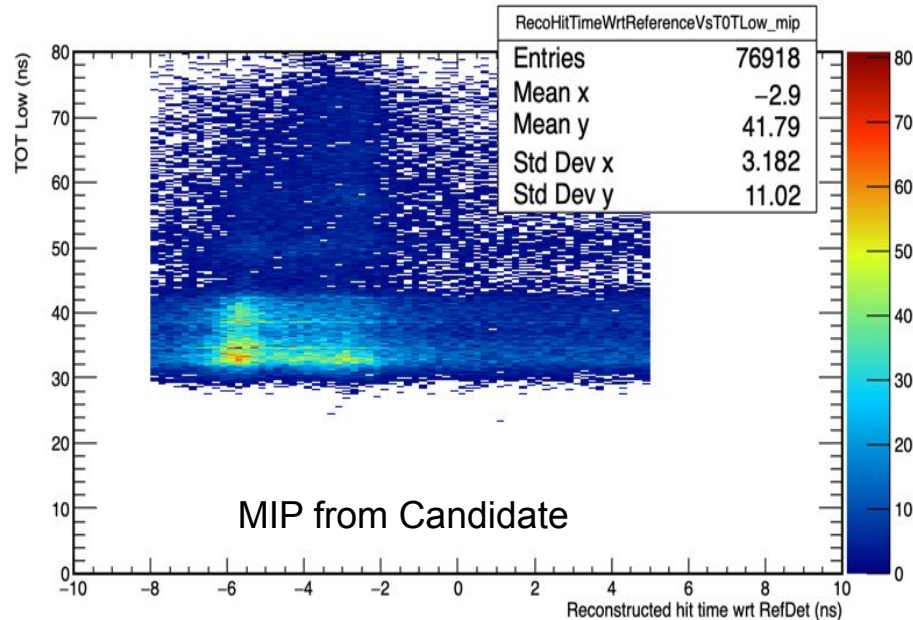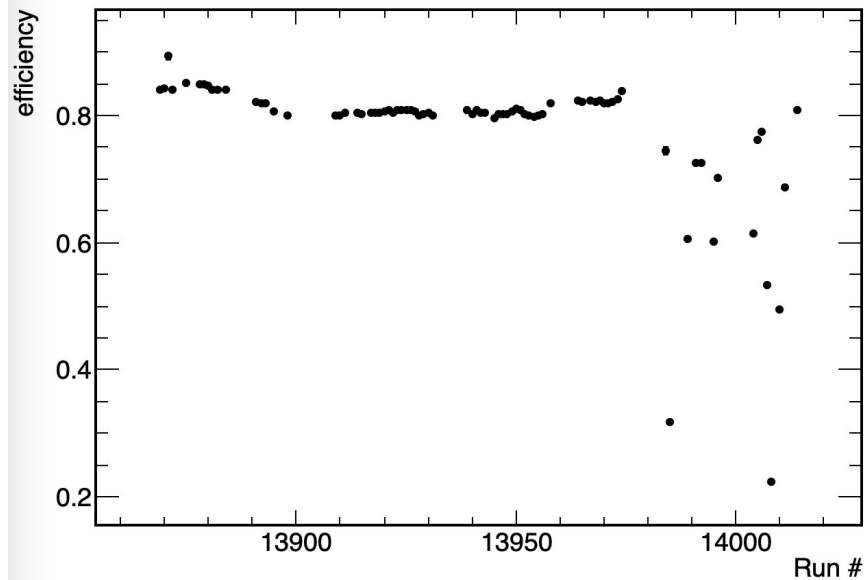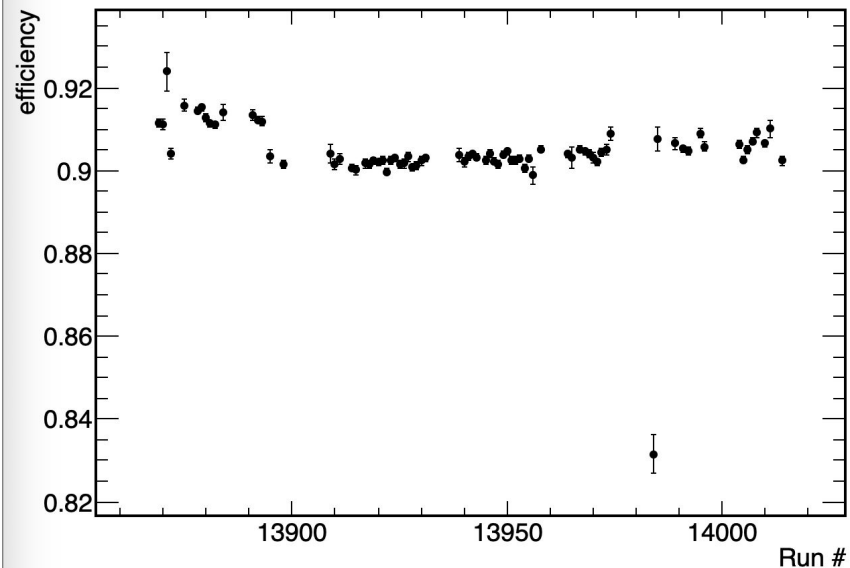
IRC TEL and cream efficiencies vs Run

- IRC drop corresponds to the introduction of mask7 (and corresponding appropriate downscaling) from run 14161
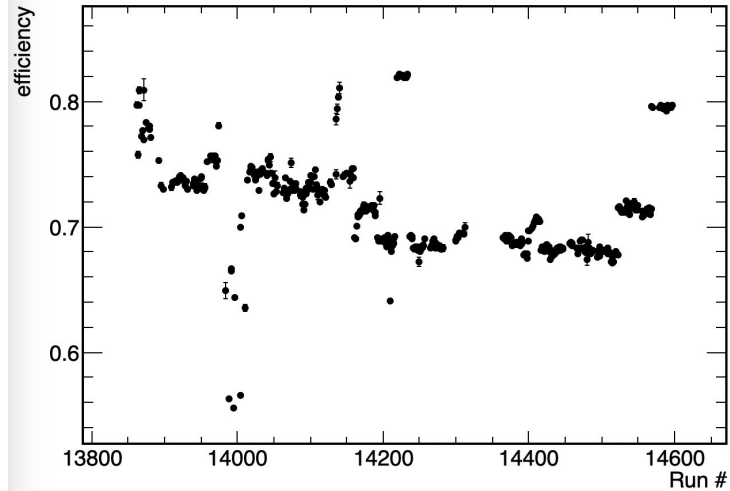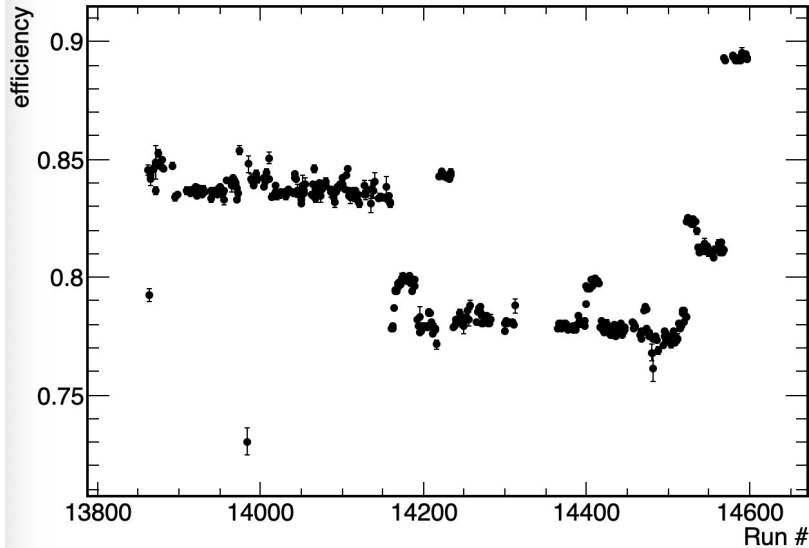
SAC TEL and cream efficiencies vs Run

IRC TEL and cream efficiencies vs Run 2024A v3.9.11

SAC TEL and cream efficiencies vs Run 2024A v3.9.11