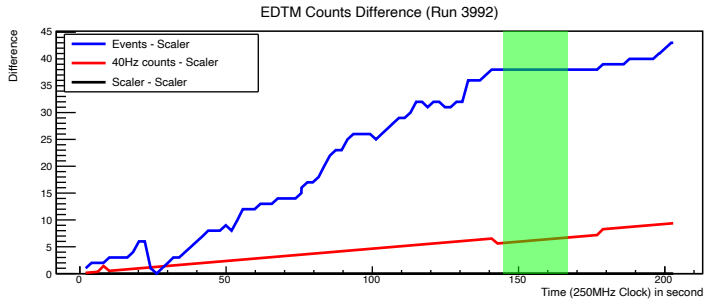
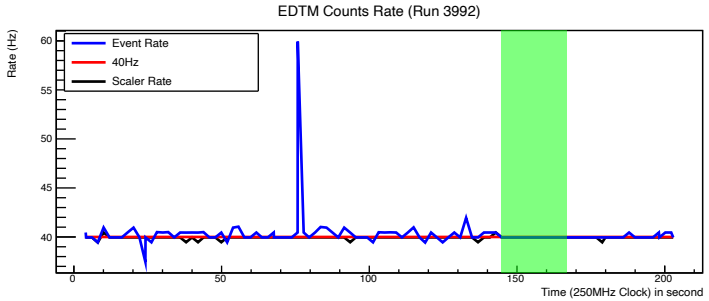
EDTM Analysis

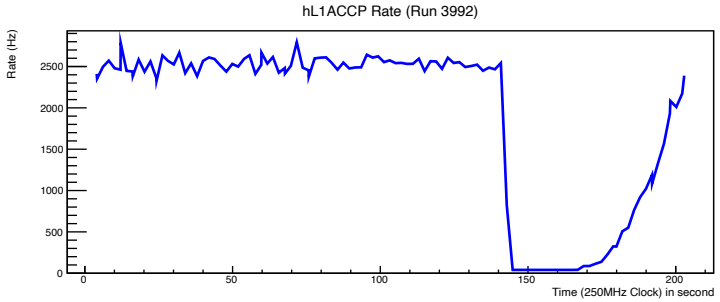
- EDTM live time > 100% is due to the tdc noise
- Where those tdc noise come from?

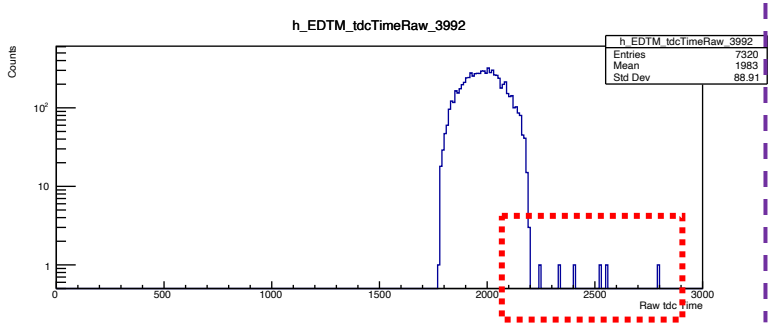
Run 3992

EDTM TDC Time Raw > 1

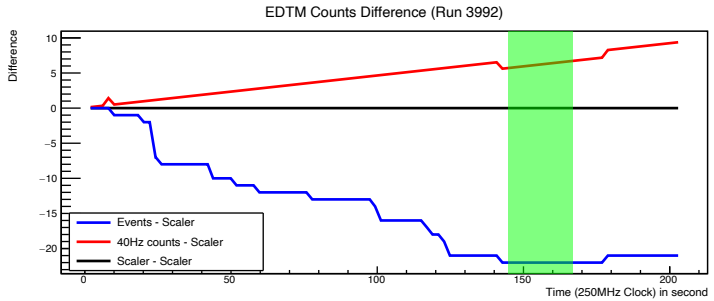


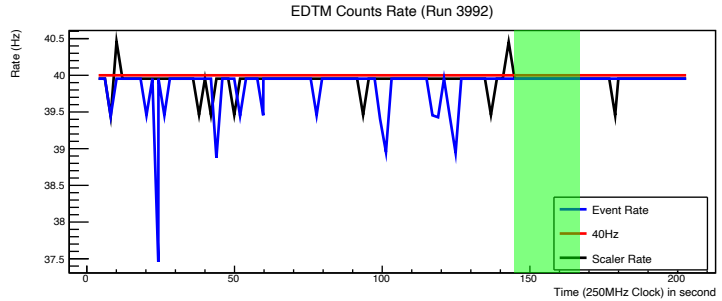


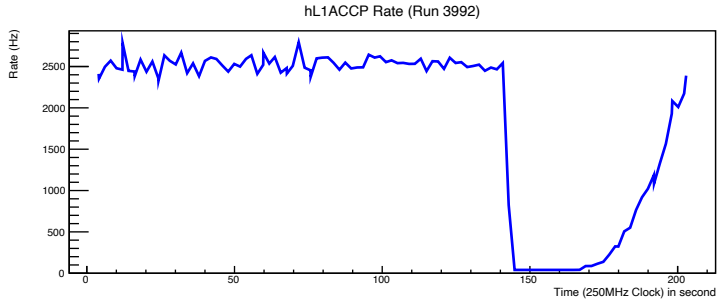


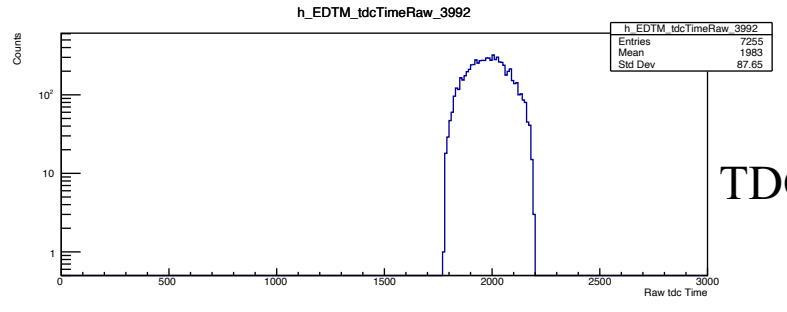


EDTM TDC Time Raw∈ [1770,2200]









EDTM Counts Diff

EDTM Rate

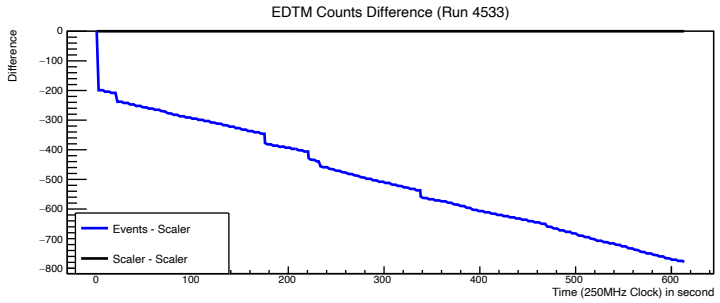
Trigger Rate

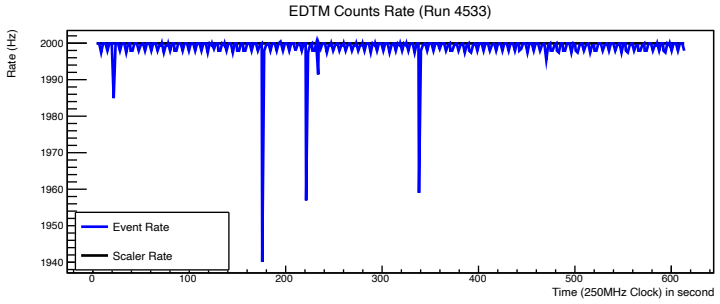
EDTM TDC Time Raw

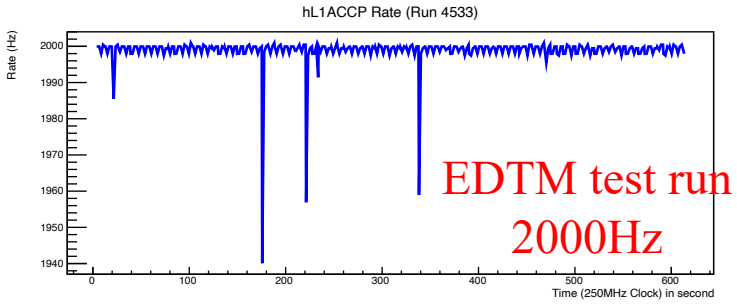
EDTM Analysis

- Where those tdc noise come from?
- It's not related with high rate
- It's related with beam

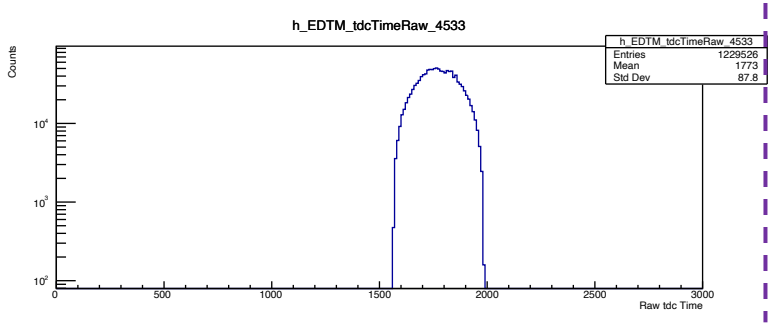
EDTM TDC Time Raw > 1



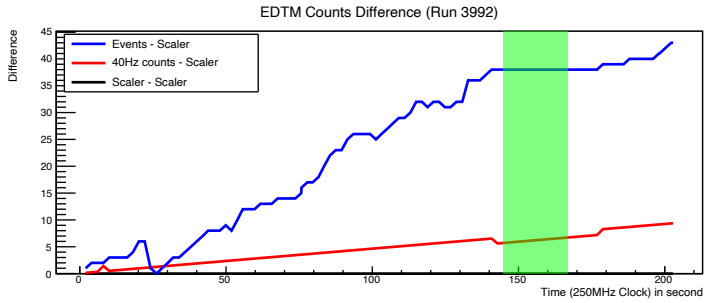




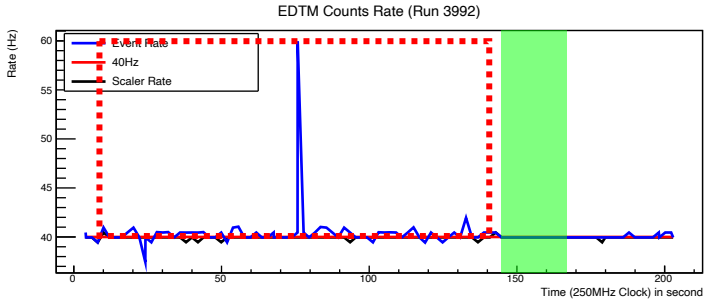
EDTM test run 2000Hz



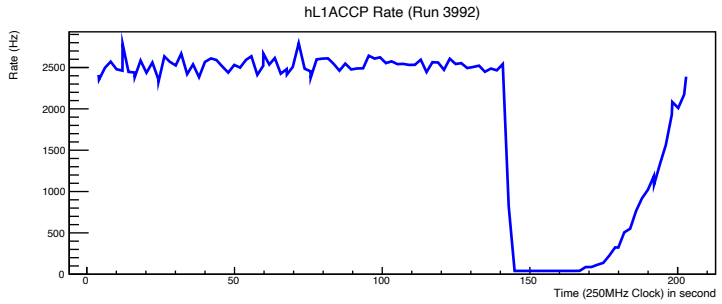
EDTM TDC Time Raw > 1



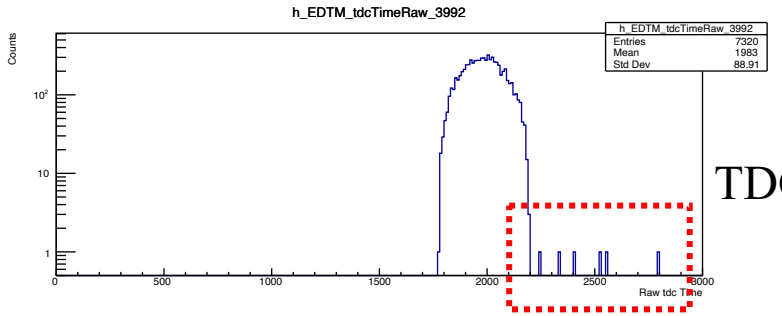
EDTM Counts Diff



EDTM Rate



Trigger Rate



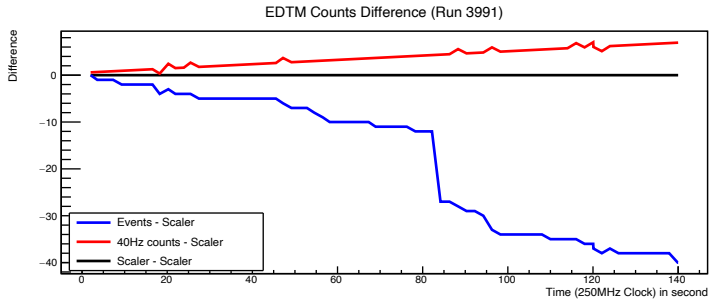
EDTM TDC Time Raw

EDTM Analysis

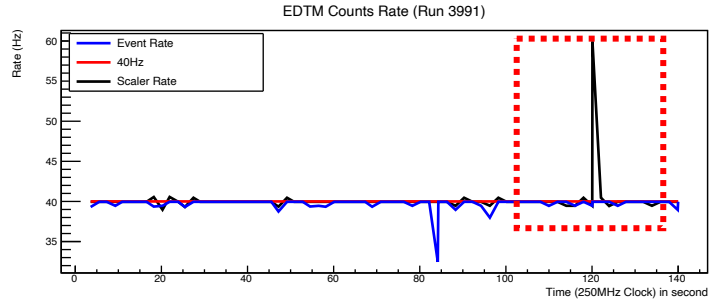
- Sometimes the EDTM scaler rate shows a high peak, that's because the two scaler readouts are too close to each other.
- The real EDTM rate is not that high.

Run 3991

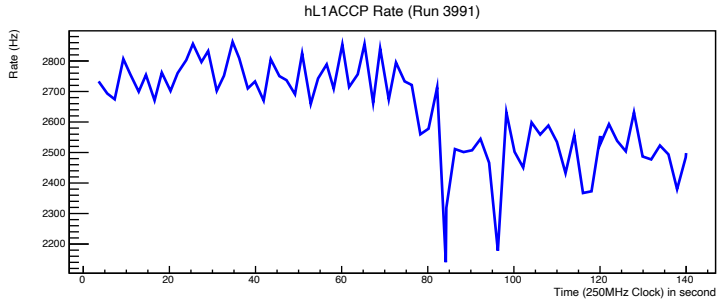
EDTM TDC Time Raw∈ [1770,2200]



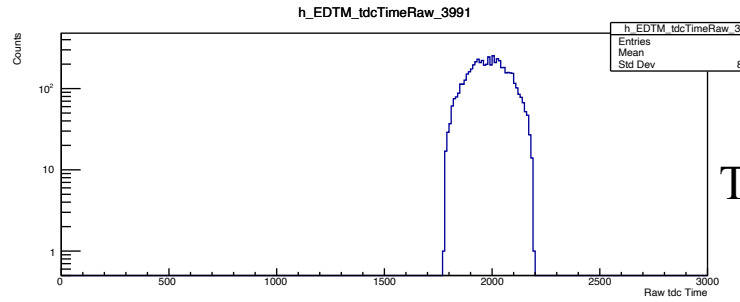
EDTM Counts Diff



EDTM Rate



Trigger Rate

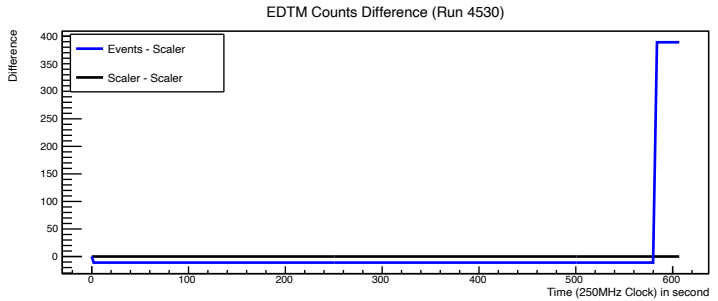


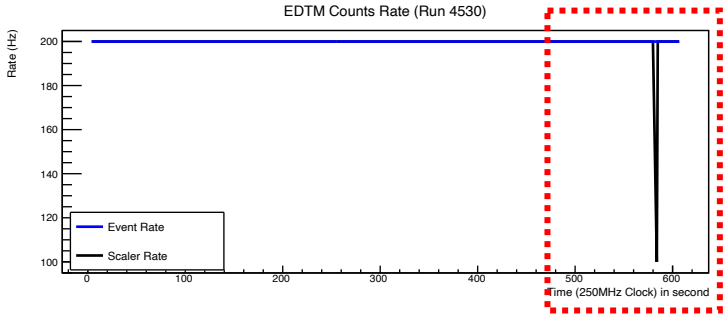
EDTM TDC Time Raw

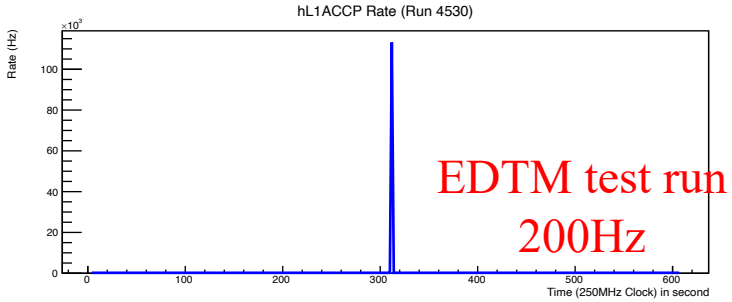
EDTM Analysis

- Sometimes the EDTM scaler rate shows a deep valley
- That's not real because the EDTM tdc rate is stable

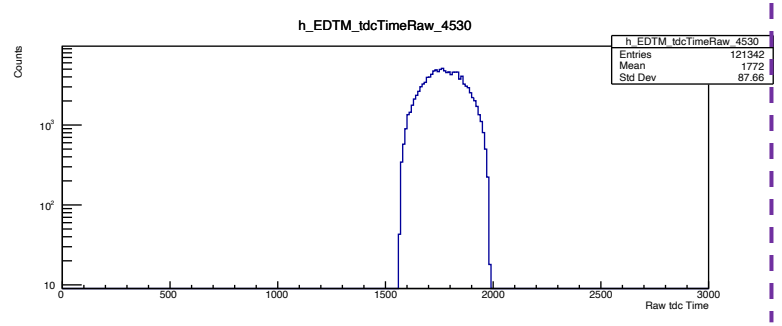
EDTM TDC Time Raw > 1



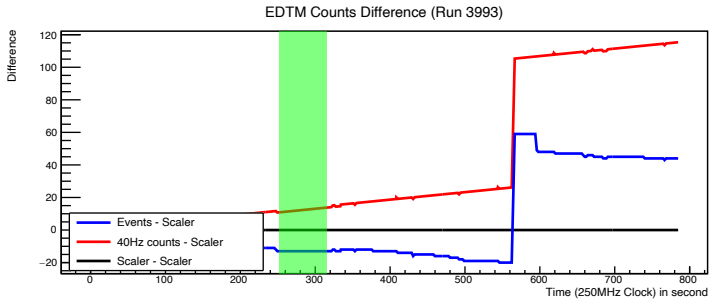




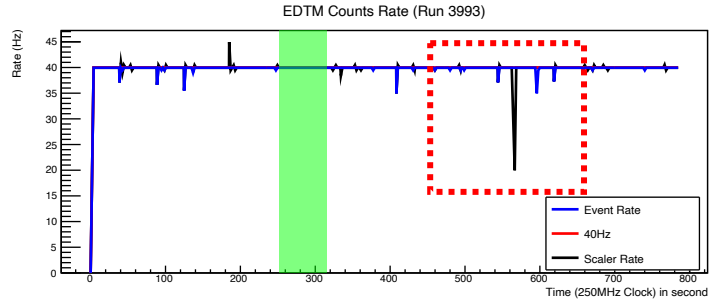
EDTM test run 200Hz



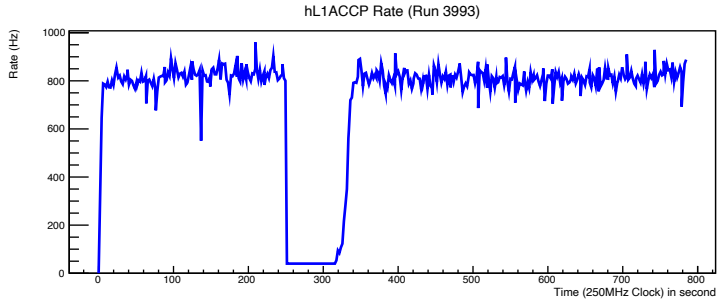
EDTM TDC Time Raw∈ [1770,2200]



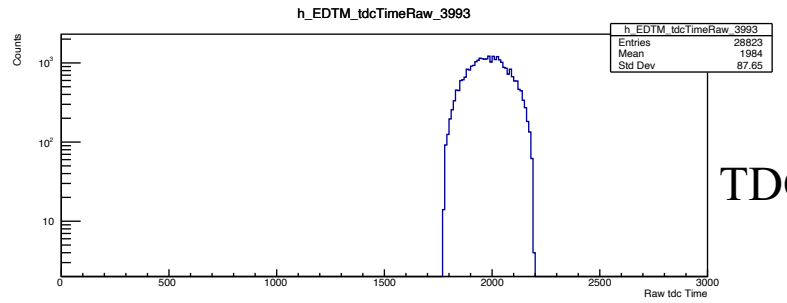
EDTM Counts Diff



EDTM Rate



Trigger Rate

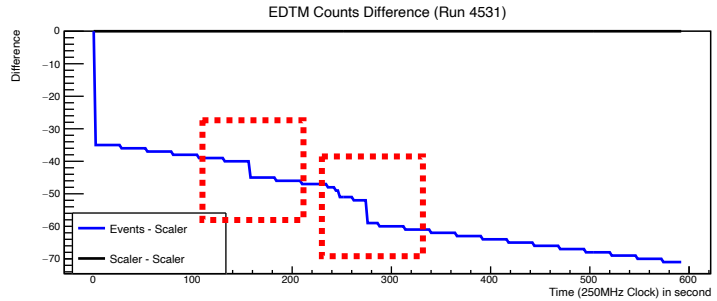


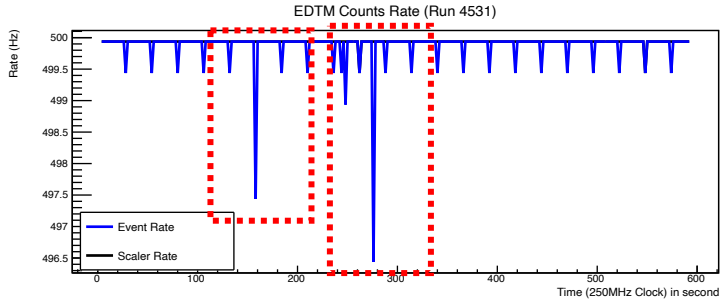
EDTM TDC Time Raw

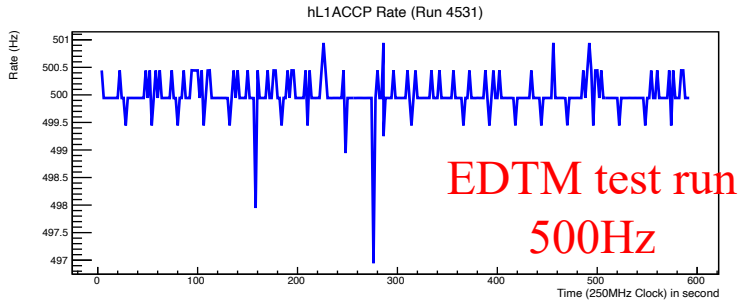
EDTM Analysis

- The sudden drops appeared in both production and test runs
- The drop appeared only for high rate runs (>200Hz)
- The reason could be some limitations in the daq system

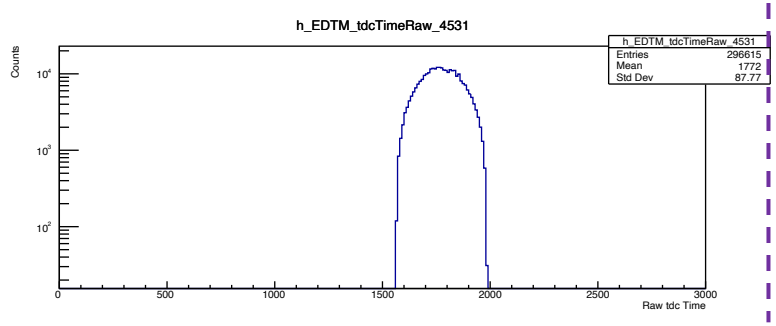
EDTM TDC Time Raw > 1



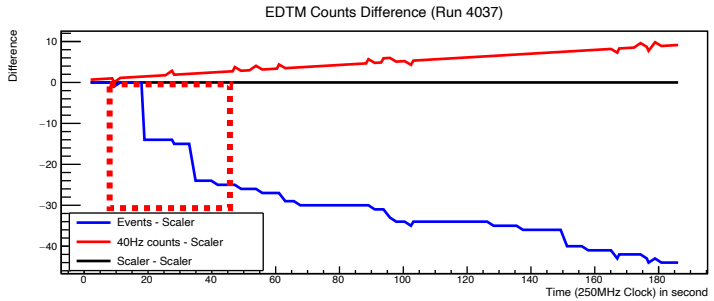


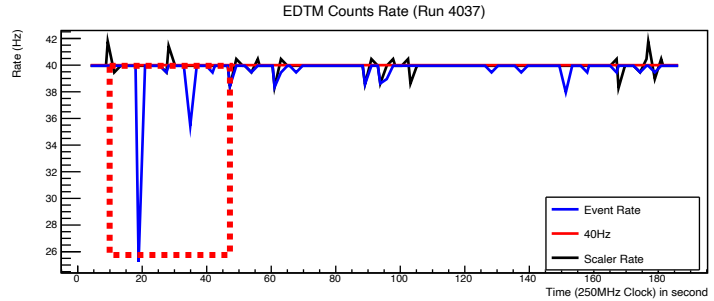


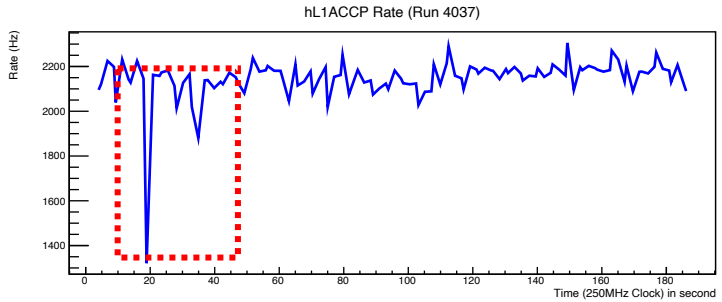
EDTM test run 500Hz

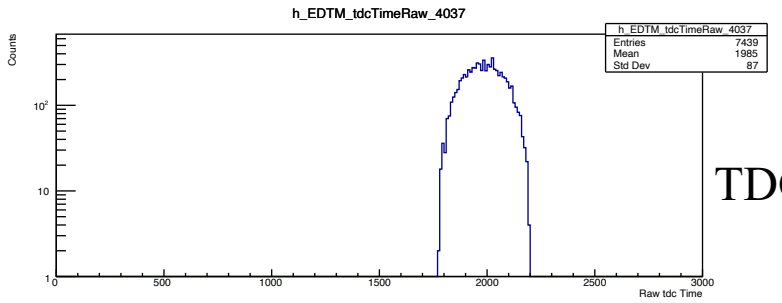


EDTM TDC Time Raw∈ [1770,2200]









EDTM Counts Diff

EDTM Rate

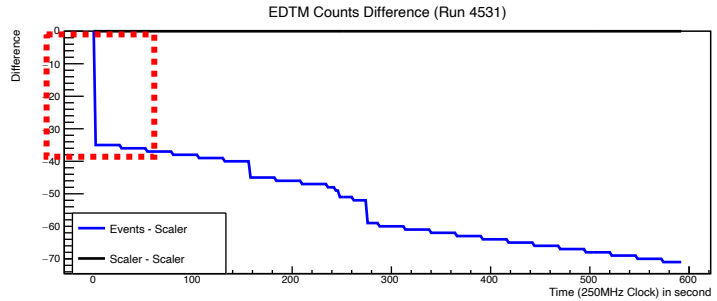
Trigger Rate

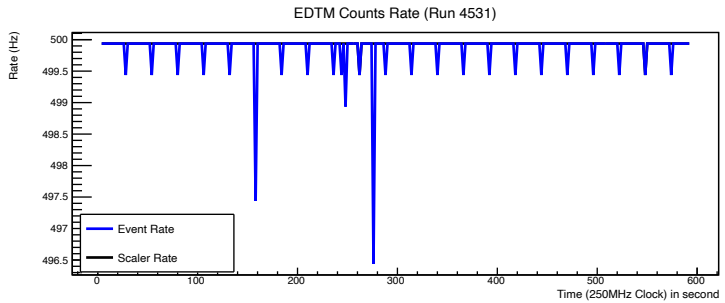
EDTM TDC Time Raw

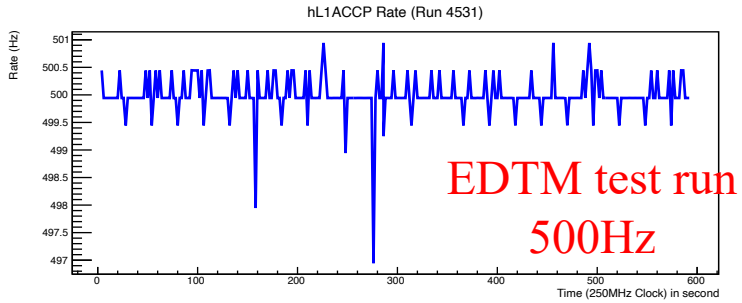
EDTM Analysis

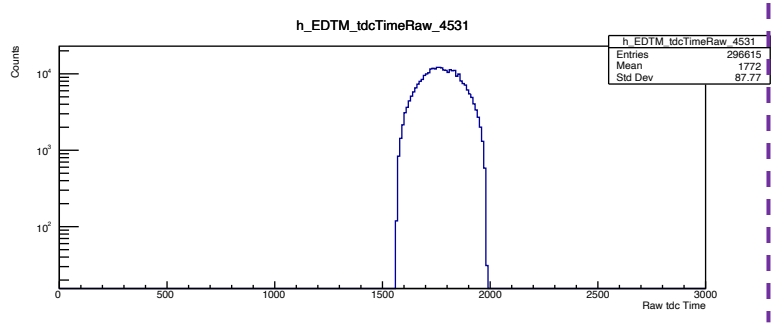
- If there a drop at the beginning of the run, that's not real

EDTM TDC Time Raw > 1

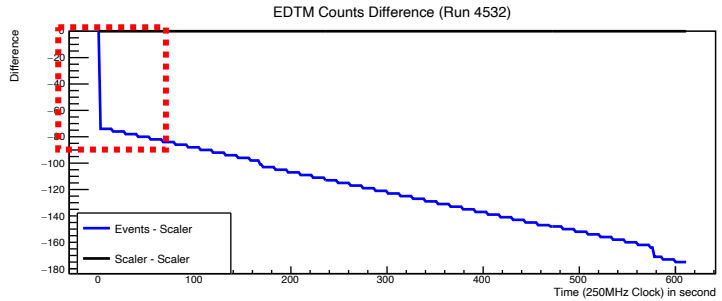


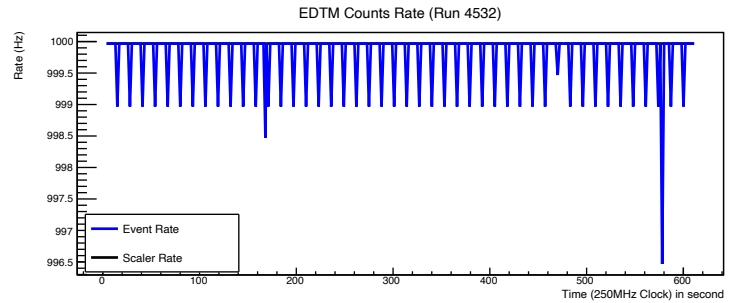


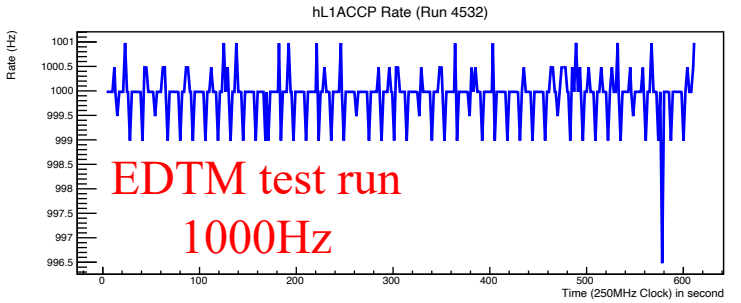


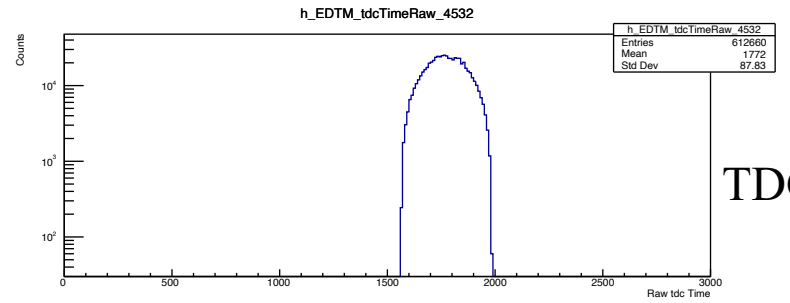


EDTM TDC Time Raw > 1









EDTM Counts Diff

EDTM Rate

Trigger Rate

EDTM TDC Time Raw

EDTM Analysis Summary

1. EDTM live time > 100 % is due to the tdc noise related with the beam (real physics trigger)
2. Sometimes the EDTM scaler rate shows a high peak, that's because the two scaler readouts are too close to each other. The real EDTM rate is still stable.
3. Sometimes the EDTM scaler rate shows a deep valley, that's not real because the EDTM tdc rate is stable. We need to correct it when calculating the EDTM dead time.
4. When the trigger rate is high (at least larger than 200Hz), there could be some obvious drops in the EDTM Counts Diff plots. That's due to some limitations of the daq system because the h1ACCP rate also shows a drop.
5. If there a drop in the EDTM Counts Diff plot at the beginning of the run, that's not real
6. According to my 6-level EDTM test runs (50, 100, 200, 500, 1000, 2000 Hz), when the trigger rate is larger than a certain value between 200 and 500, the daq system starts to have deadtime.

When we're calculating the EDTM dead time for a run,
in addition to adding a 2 uA beam current cut, the above things should also be considered.