TOF: TDC signal selection

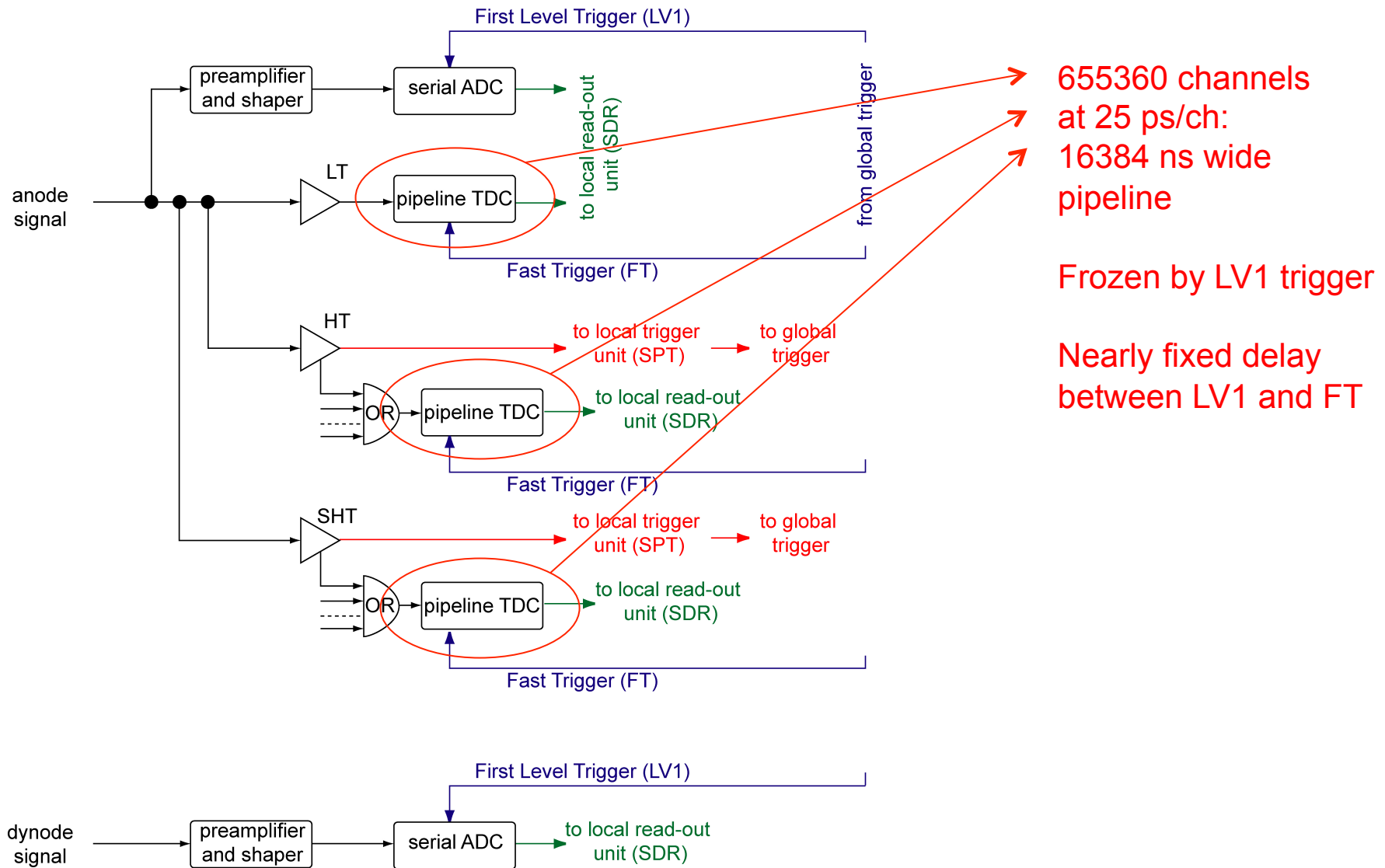# A. Contin

TOF Group, February 2012

Goals

Select the good TDC signals:

- Low Threshold
- High Threshold
- SuperHigh Threshold

Principle

TOF time signals and the Fast Trigger are registered on pipeline TDCs

655360 channels
at 25 ps/ch:
16384 ns wide
pipeline

Frozen by LV1 trigger

Nearly fixed delay
between LV1 and FT

Event selection and analysis

Event selection:

1. Trigger: TOF
2. Physics Run tag
3. No SAA
4. Only one tracker track fitted with internal planes, $|R|>3$, $Chi2<10$
5. TRD track matched to the tracker track

Runs 1324001261 to 1324394672, B550/pass2

9,500,000 triggers
686,960 selected events

Analysis:

- plot LT, HT and SHT TDC signal times – absolute time distributions, all counter sides
- plot LT, HT and SHT time difference w.r.t. FT – all counter sides
- plot LT, HT and SHT time difference w.r.t. FT – only sides with one FT and one LT/HT/SHT signal

Plotted data are taken from TofRawSideR

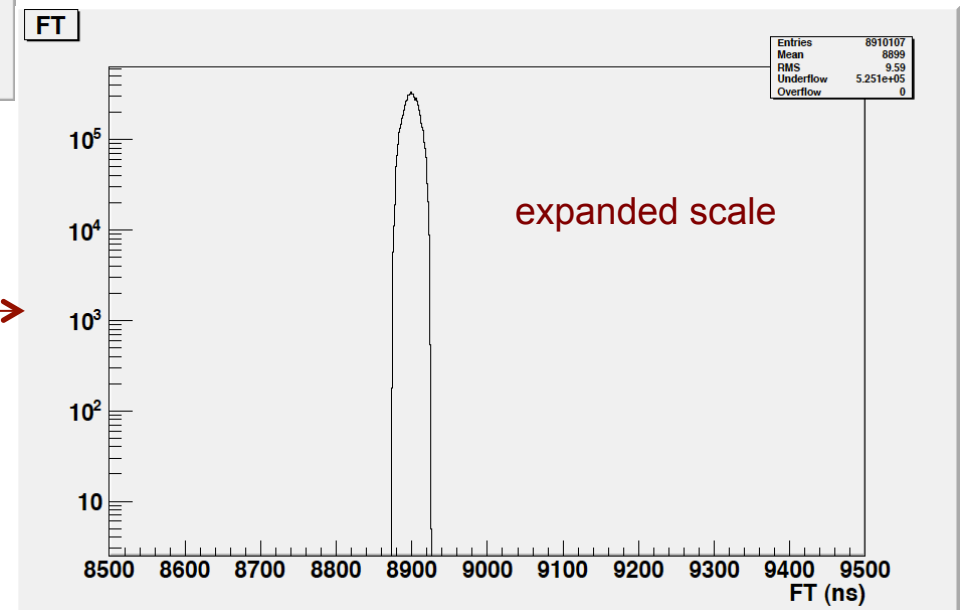# Results - number of FT, LT, HT and SHT signals per counter side
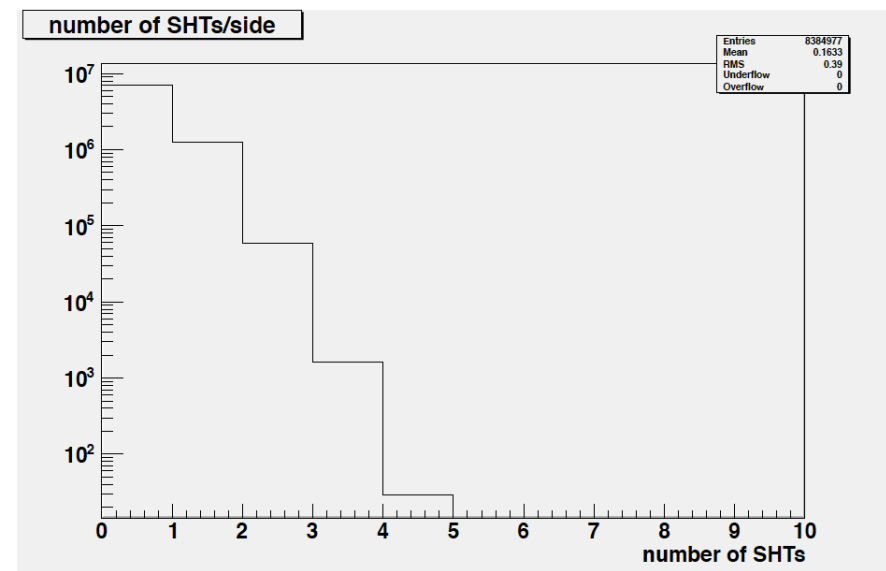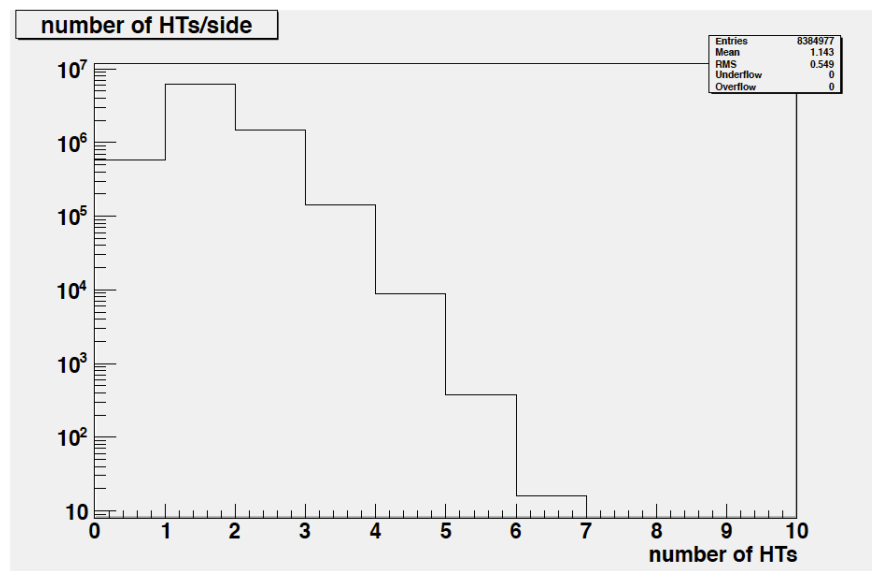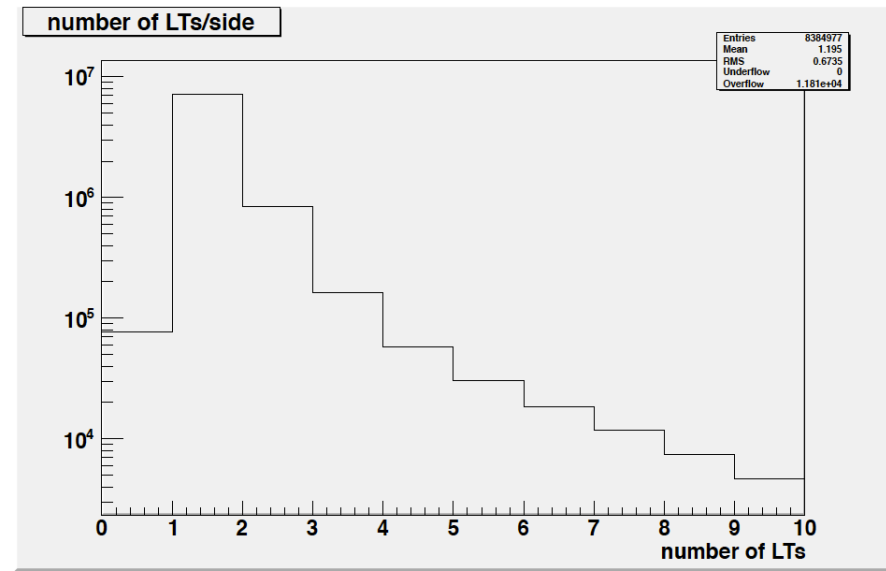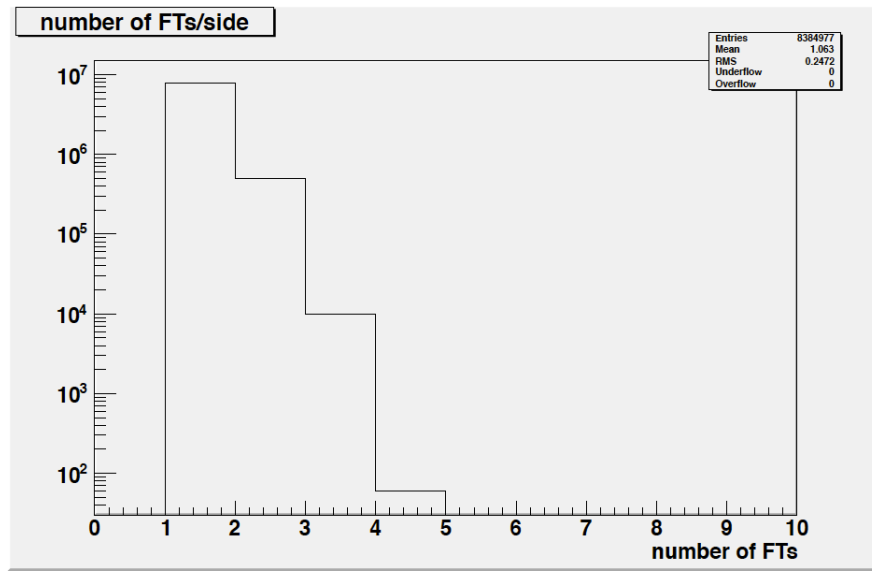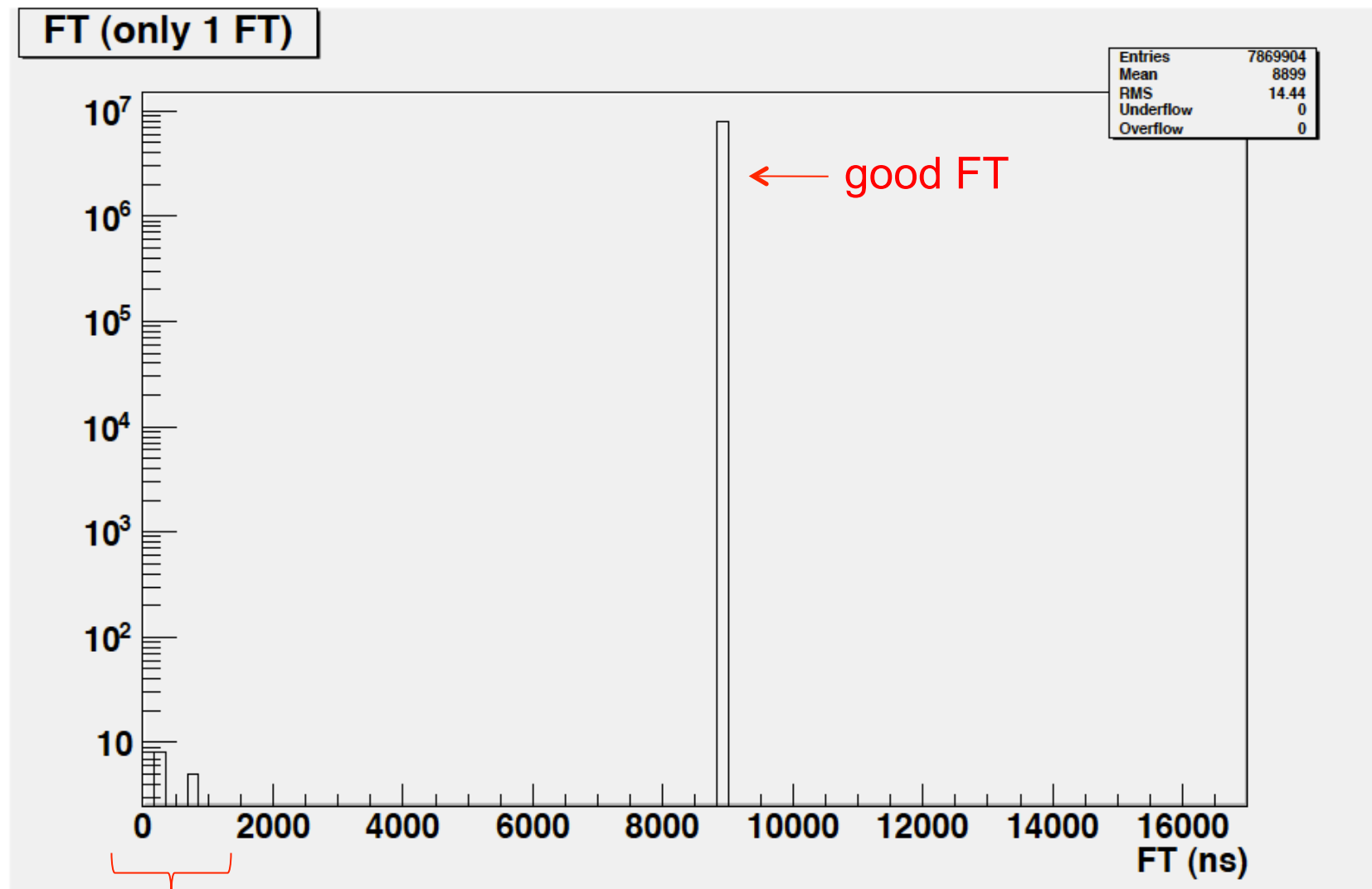
Results – Absolute time distribution FT
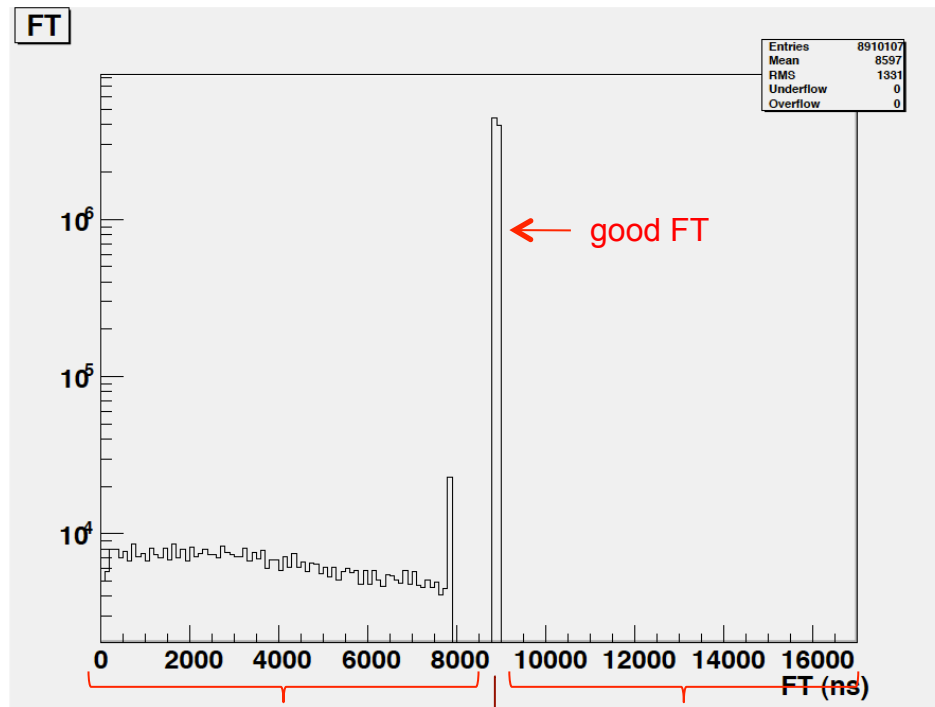
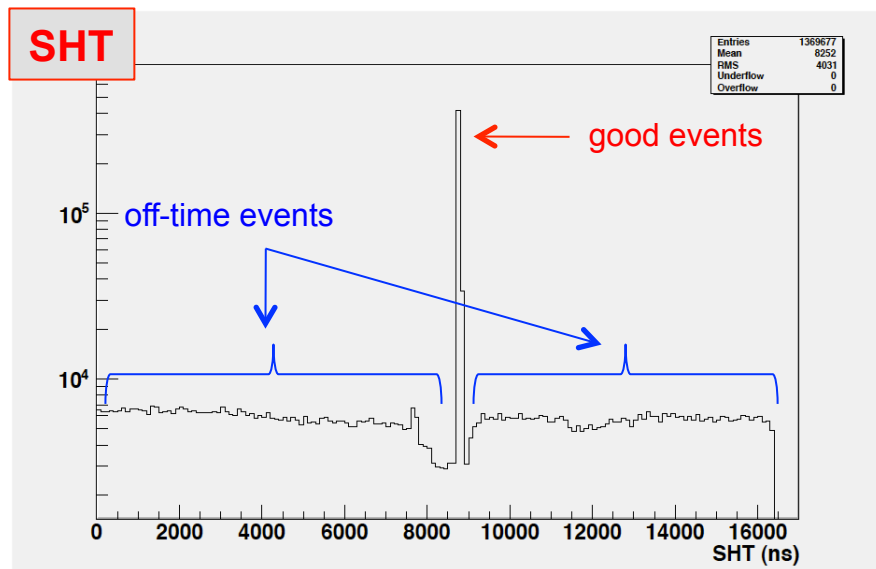
FT not confirmed by LV1

no FT because of LV1 busy

good FT

expanded scale

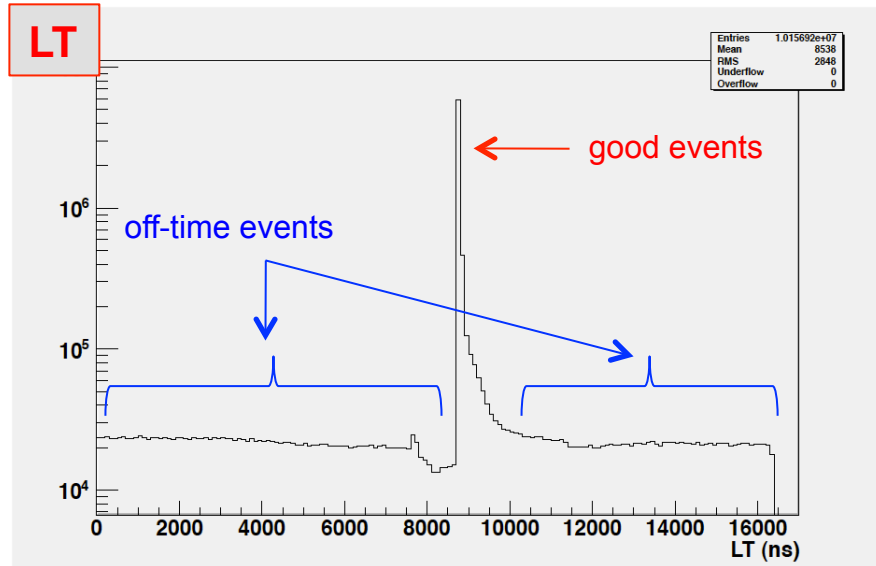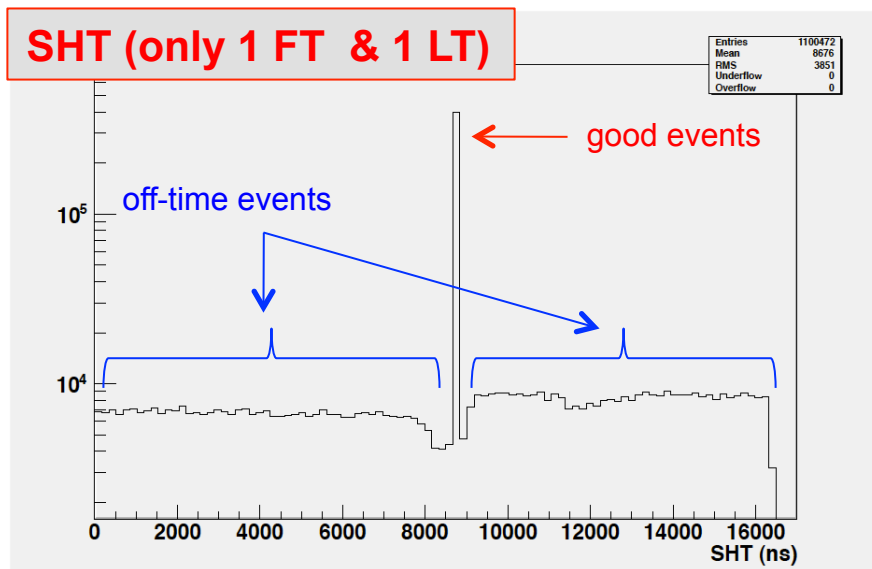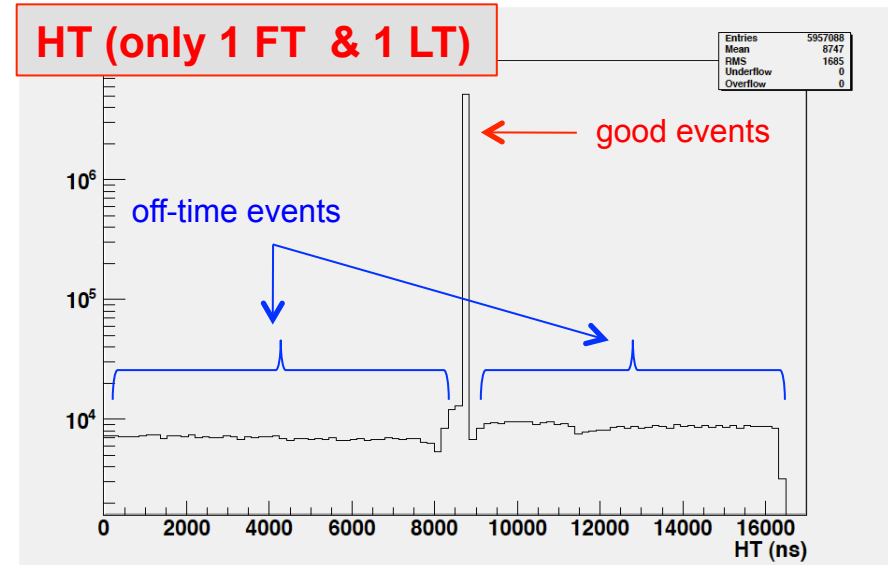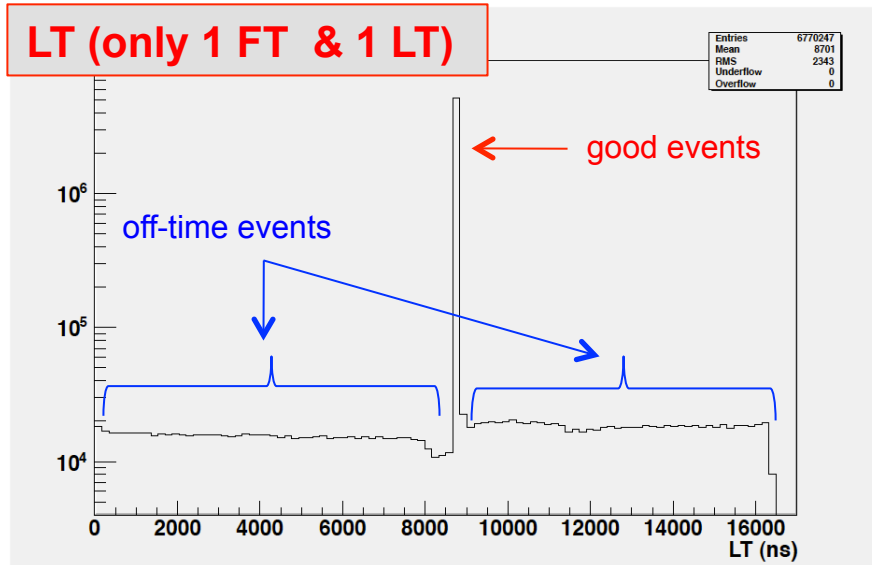# Results – Absolute time distribution FT, sides with only one FT

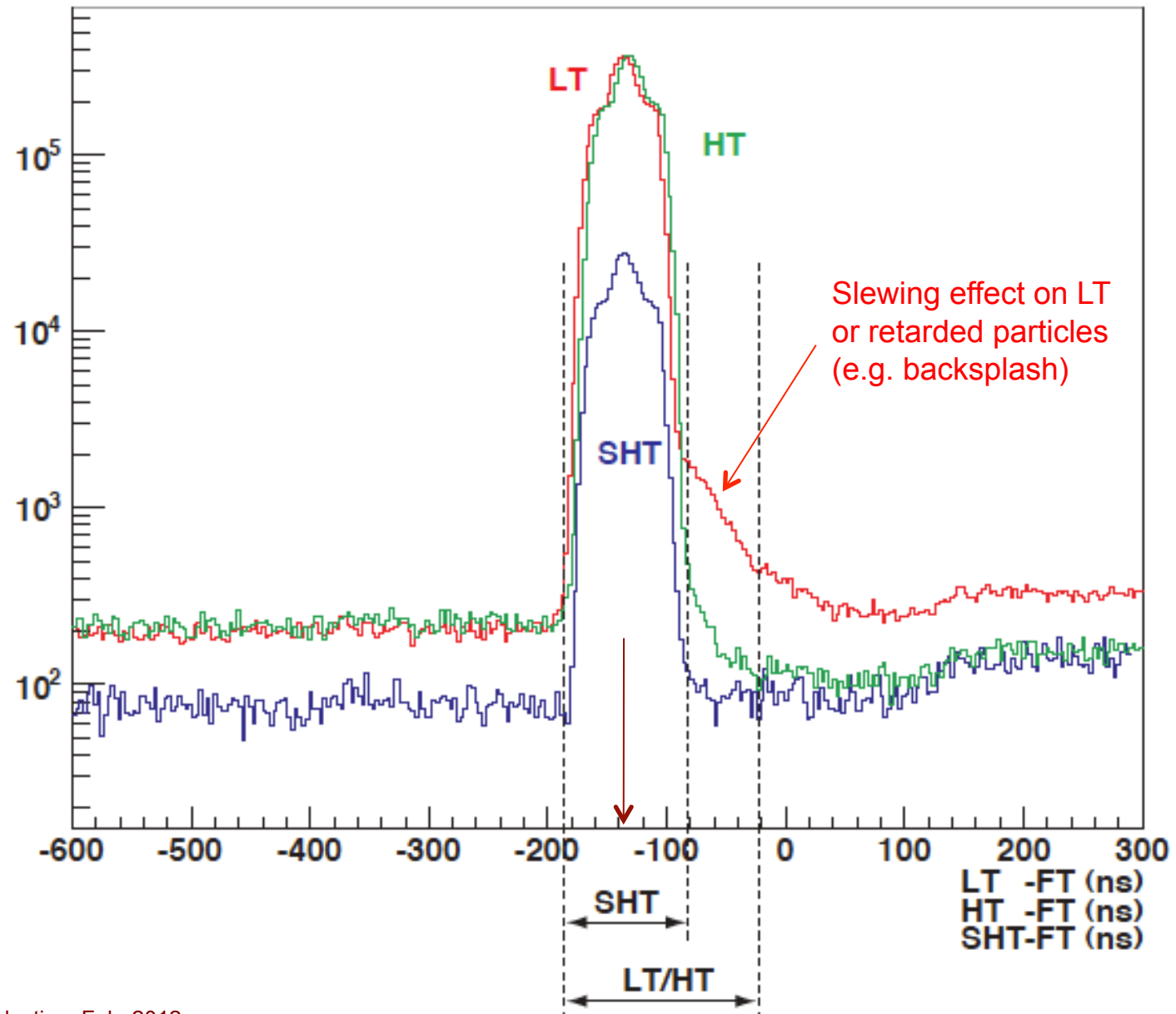# Results – Absolute time distribution LT/HT/SHT

The request of only one FT and only one LT/HT/SHT cleans up the histograms.

The assumption is that, when more than one LT/HT/SHT signal is present, the good ones follow the distributions shown here and on the next page (with an expanded scale).

Expanded scale

Conclusion

Proposed algorithm:

1. If there is more than one FT signal the good one is the last.

2. Anyhow, the good FT signal must have a value between 8870 and 8930 ns (consistent with the 50 ns clock of the JLV1).

3. For LT, HT and SHT, if there is more than one signal, the best guess for the good one is the signal nearest to -140 ns w.r.t. the FT time.