# CAEN Front-End Readout System DT-5202 Tests

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# DT5202 Information

- 64 channels
- 4 readout modes
- Connection via Micro USB or Ethernet

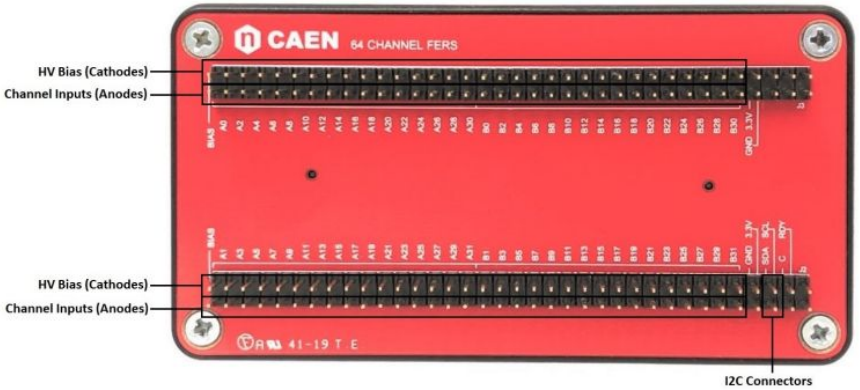



**Fig. 7.9:** DT5202 back panel view (A5250 adapter mounted).


**Fig. 7.6:** DT5202 front panel view.

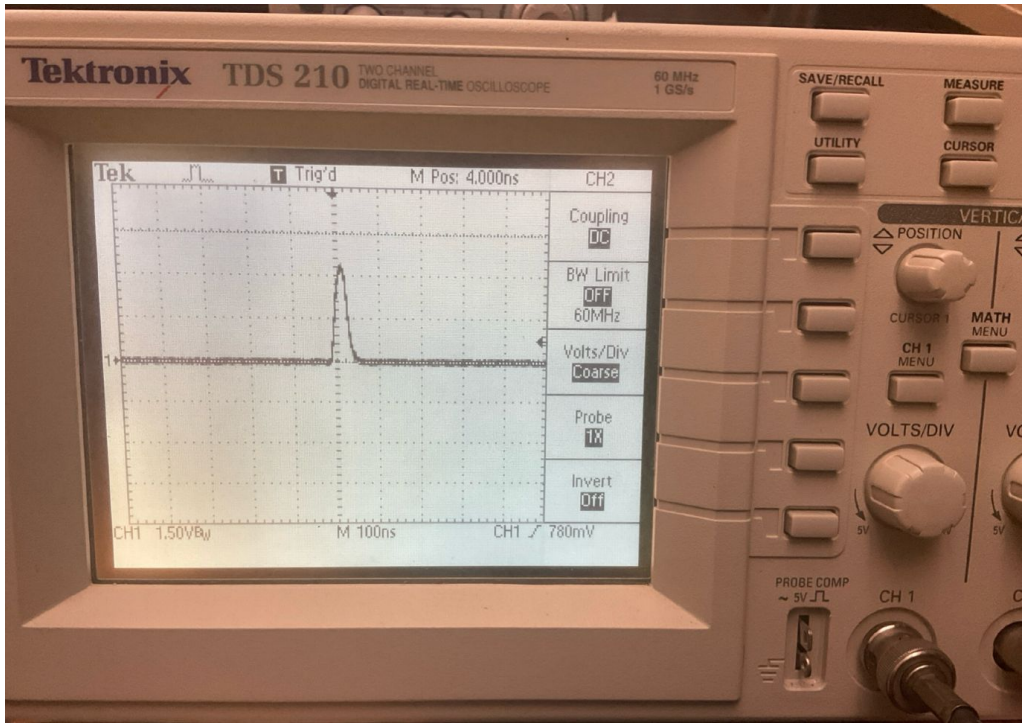
Figures taken from the CAEN DT5202 user manual, pp 28-29

# FERS Readout Modes

- Spectroscopy (Pulse Height Analysis):
  - Global trigger; all channels perform ADC of pulse amplitude; conversion delay is 10 μs.
- Timing:
  - Time over Threshold or Time of Arrival; channels run independently
- Counting:
  - Counts self triggers for each channel individually; max counting rate is 20 Mcps
- Spectroscopy and Timing:
  - PHA and Timing data available

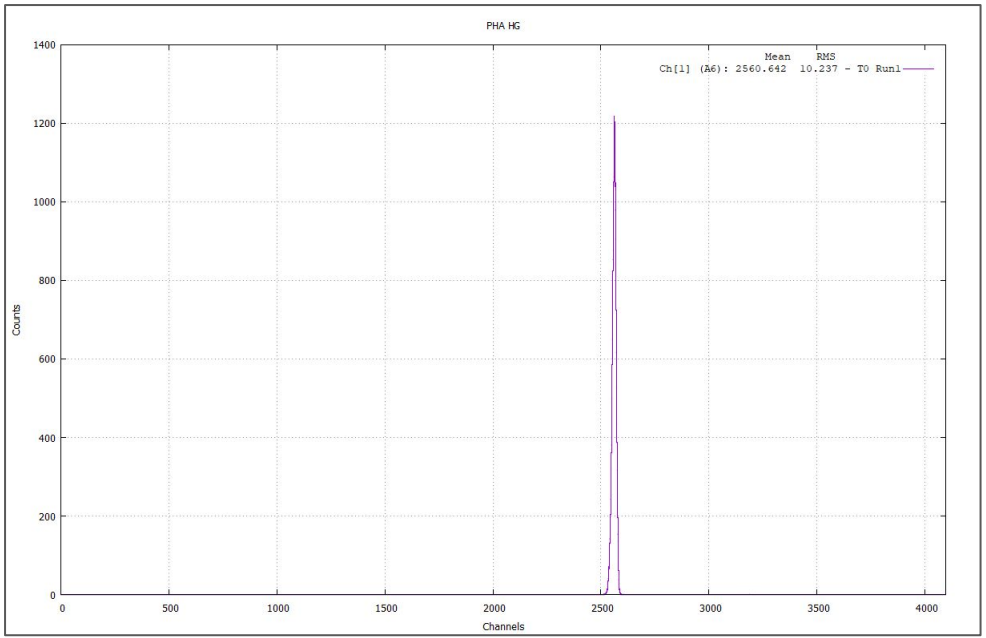
# Initial Test (Internal Pulse)

- Micro USB connection to PC
- Janus for Windows
  - Two modes for Janus: GUI and Console mode
  - Using GUI mode for these tests
- Used the DT5202's internal pulse to test if the unit was working
- Pulse Amplitude set to 300 for all tests



# Spectroscopy Mode

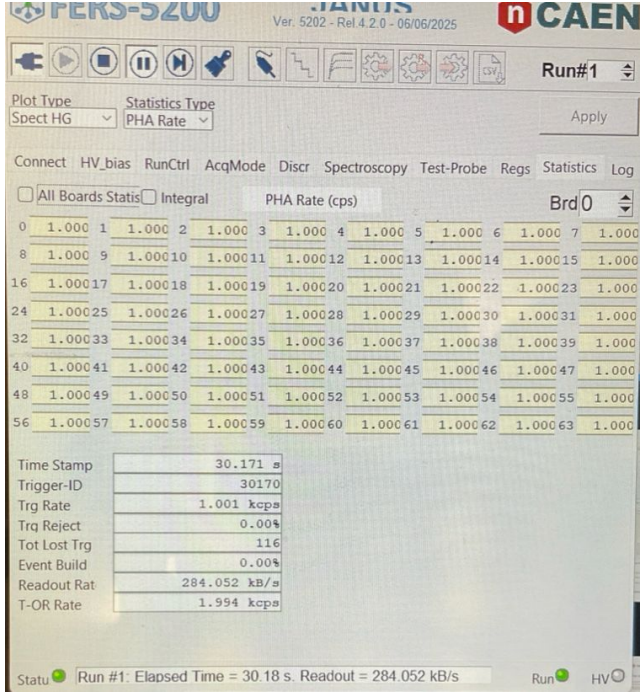
- Gain Selection Modes: High Gain (HG), Low Gain (LG), Both, Auto
  - Plot types: HG & LG
- Statistics: PHA Rate & PHA Count
- Default settings from manual:
  - LG/HG set to 50
  - Trigger period 1 ms
  - Channel trigger width 8 ns



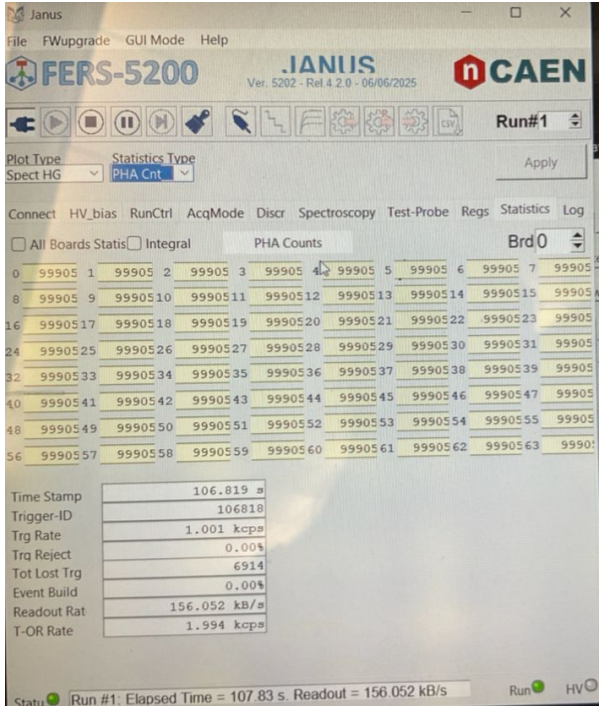

Spectroscopy mode using HG for gain selection and plotting (similar results for LG and HG+LG)

# Spectroscopy Statistics

PHA Rate

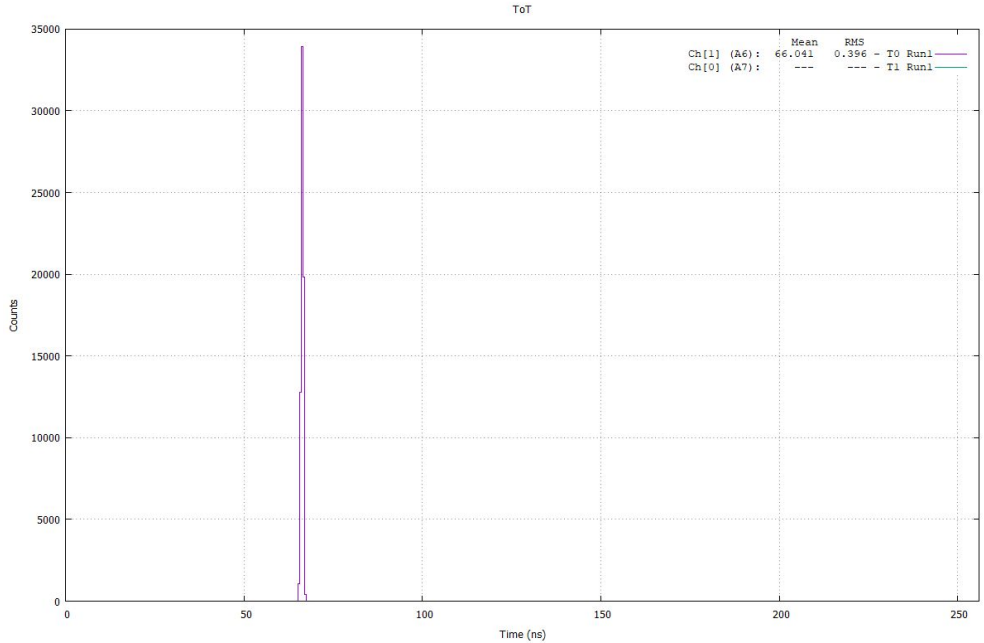



PHA Count



# Timing Mode

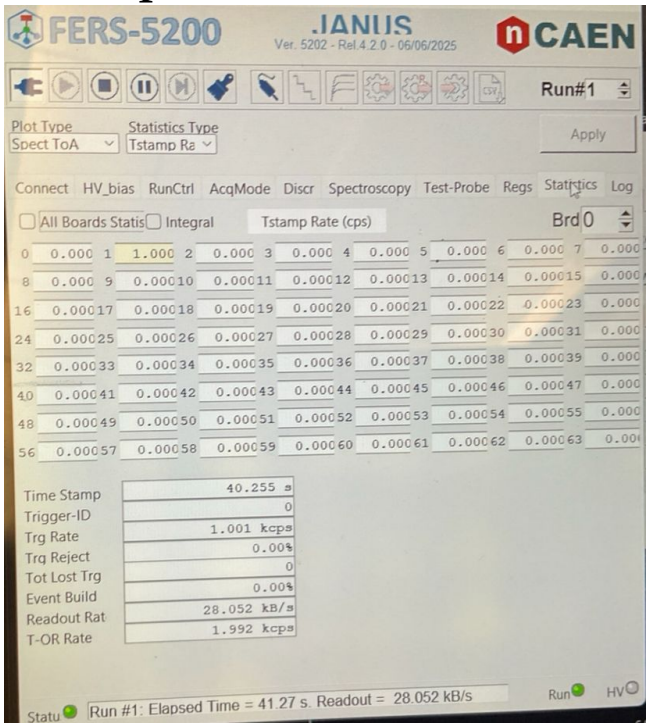
- Trigger settings: Common Start & Common Stop
  - Only Common Start available for internal pulse
- Plot types: Time of Arrival (ToA) & Time over Threshold (ToT)
- Settings from manual:
  - Tref window set to 1 µs
  - No Tref delay
  - Fast Shaper Input set to LG



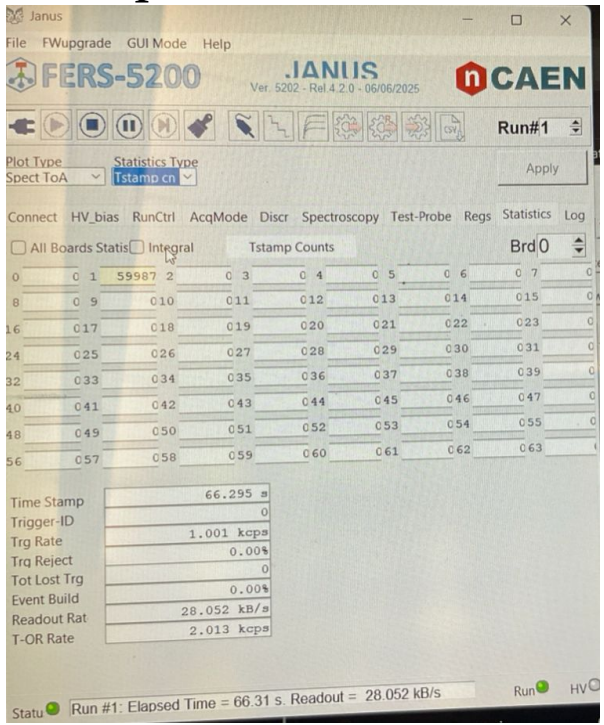

Timing mode with ToT plot for TD Coarse Threshold at 300

# Timing Statistics

TStamp Rate

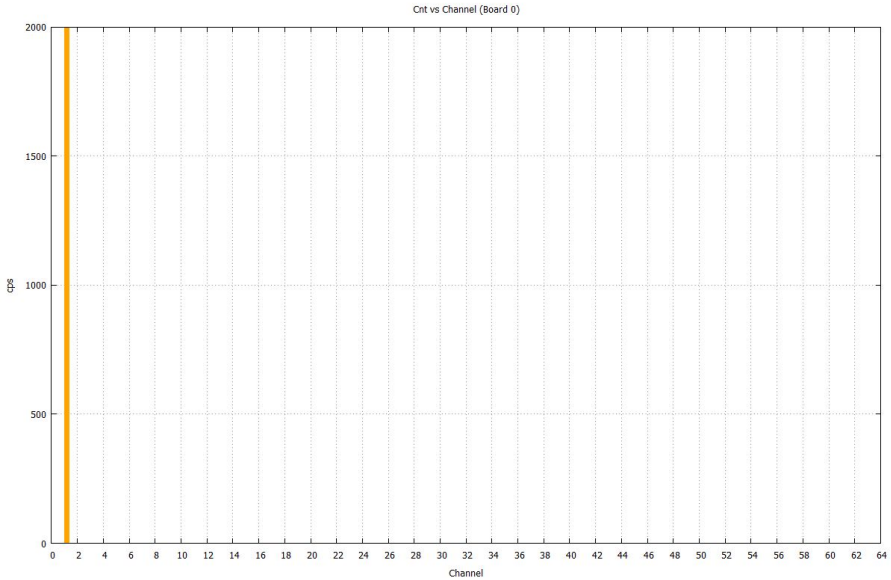



TStamp Count



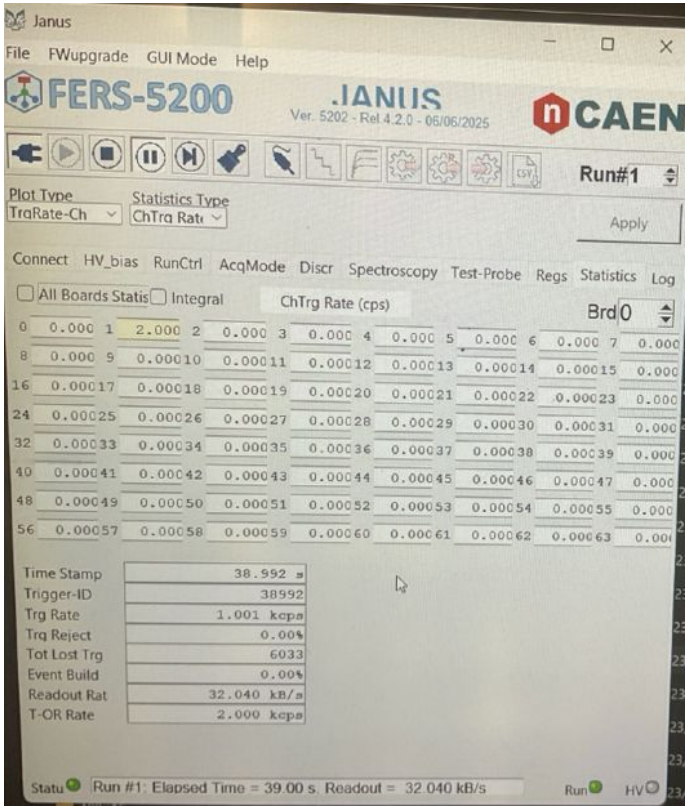
# Counting Mode

- Pulse for channel 1 only
- Counting intervals determined by either external signal or programmable gate width
  - Programmed gate width for this test
- Settings
  - 8 ns gate width
  - Digital probe set to “CLK 1024” (internal signal at about 61 Hz)



# Counting Statistics

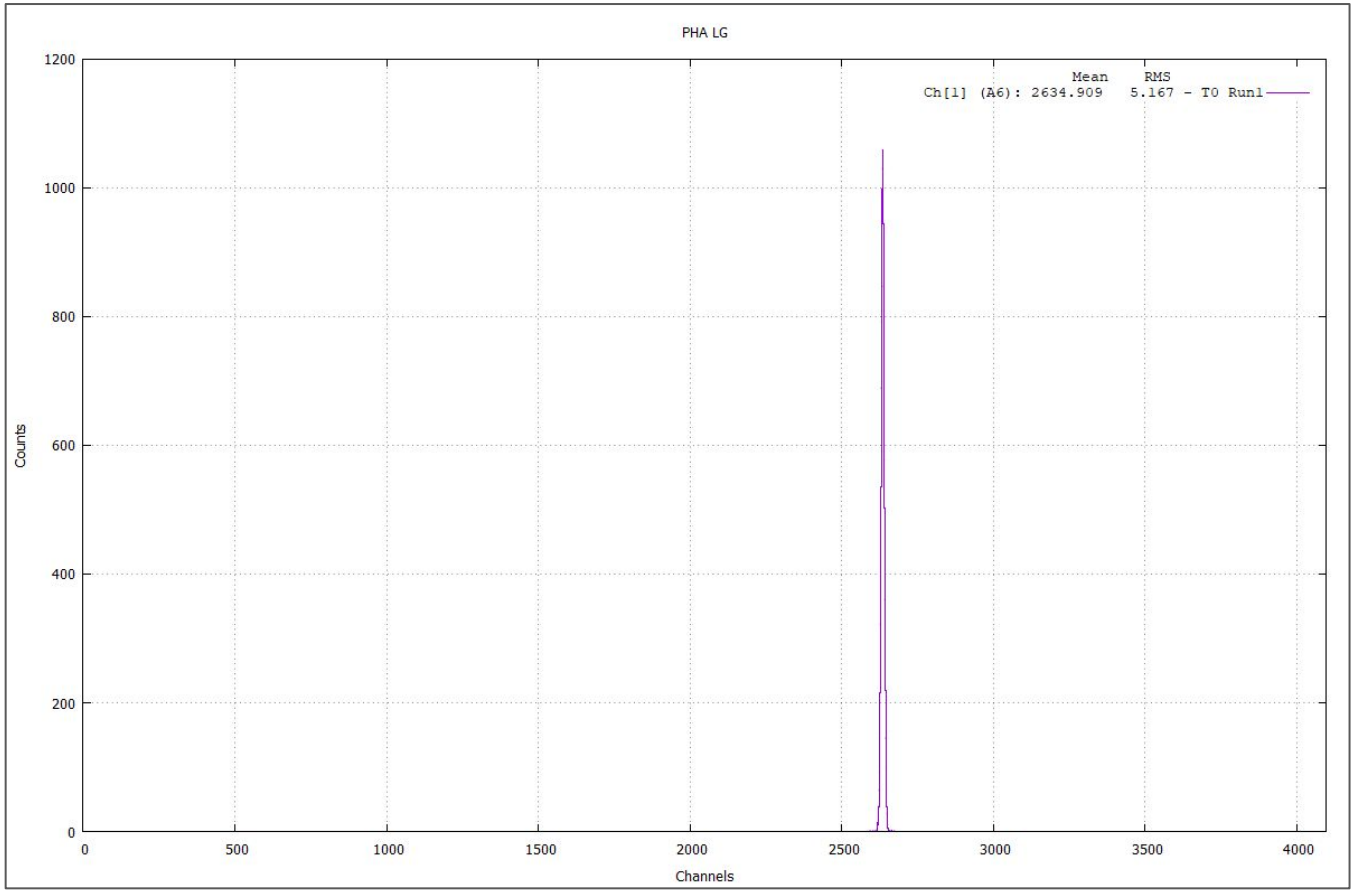
- Statistics Type: ChTrg Rate



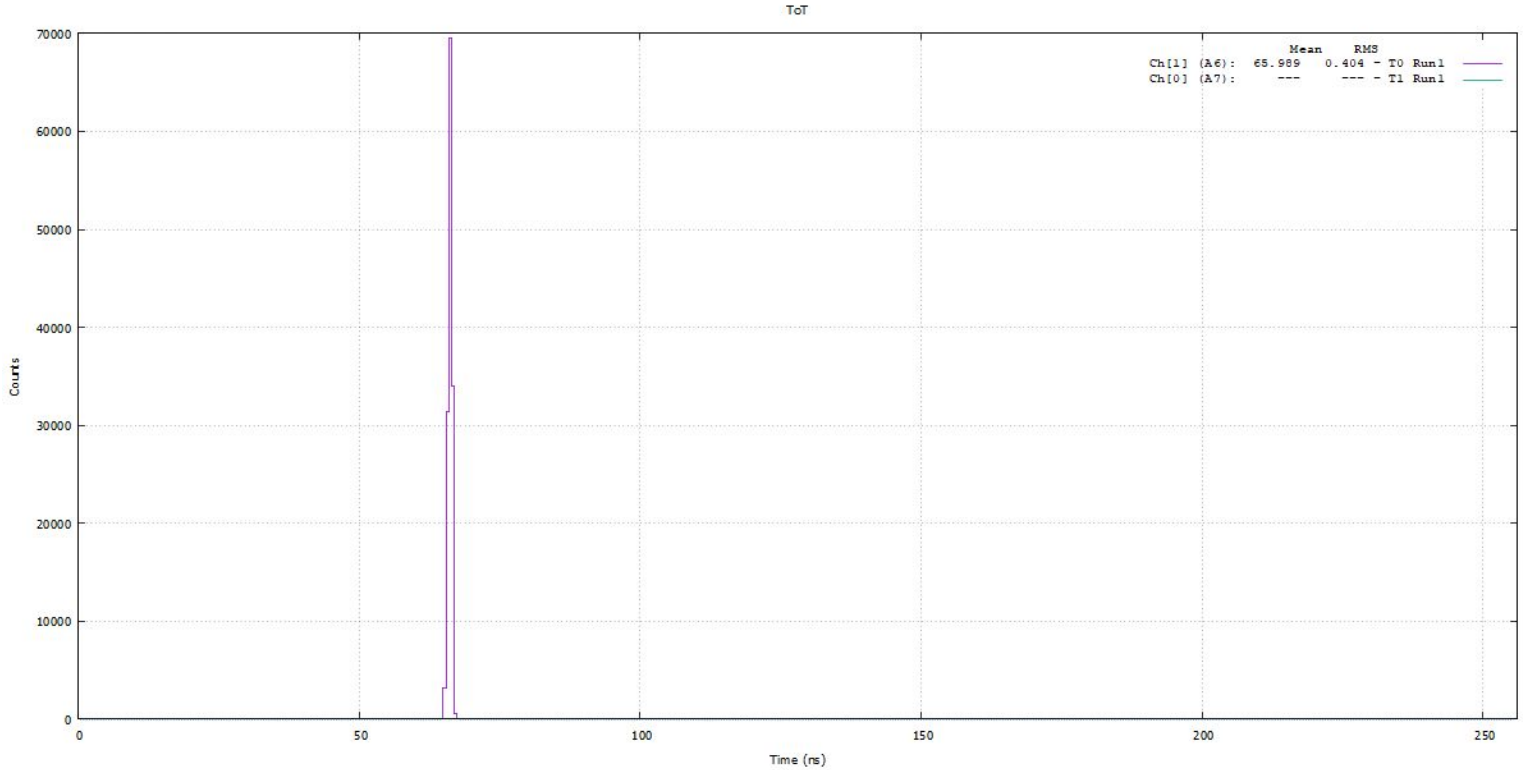
# Conclusions & Next Steps

- FERS unit seems to be working in all modes so far
- Further tests: use external source
  - SiPM
- Test different inputs to multiple channels

# Spectroscopy: LG



# Timing: ToA


ToT
Mean RMS
Ch[1] (A6): 65.989 0.404 - T0 Run1
Ch[0] (A7): --- --- - T1 Run1
Counts
Time (ns)
0
10000
20000
30000
40000
50000
60000
70000
0
50
100
150
200
250