

2021 ECAL and HODO Performance

HPS Collaboration Meeting

N. Baltzell - November 15, 2021

ECAL Hardware

- Preamps

- Half a dozen replaced before the run, was 100% operational
- **But lost a couple more just prior/during the run on the extremities or electron side, and decided not to open**

- Chiller

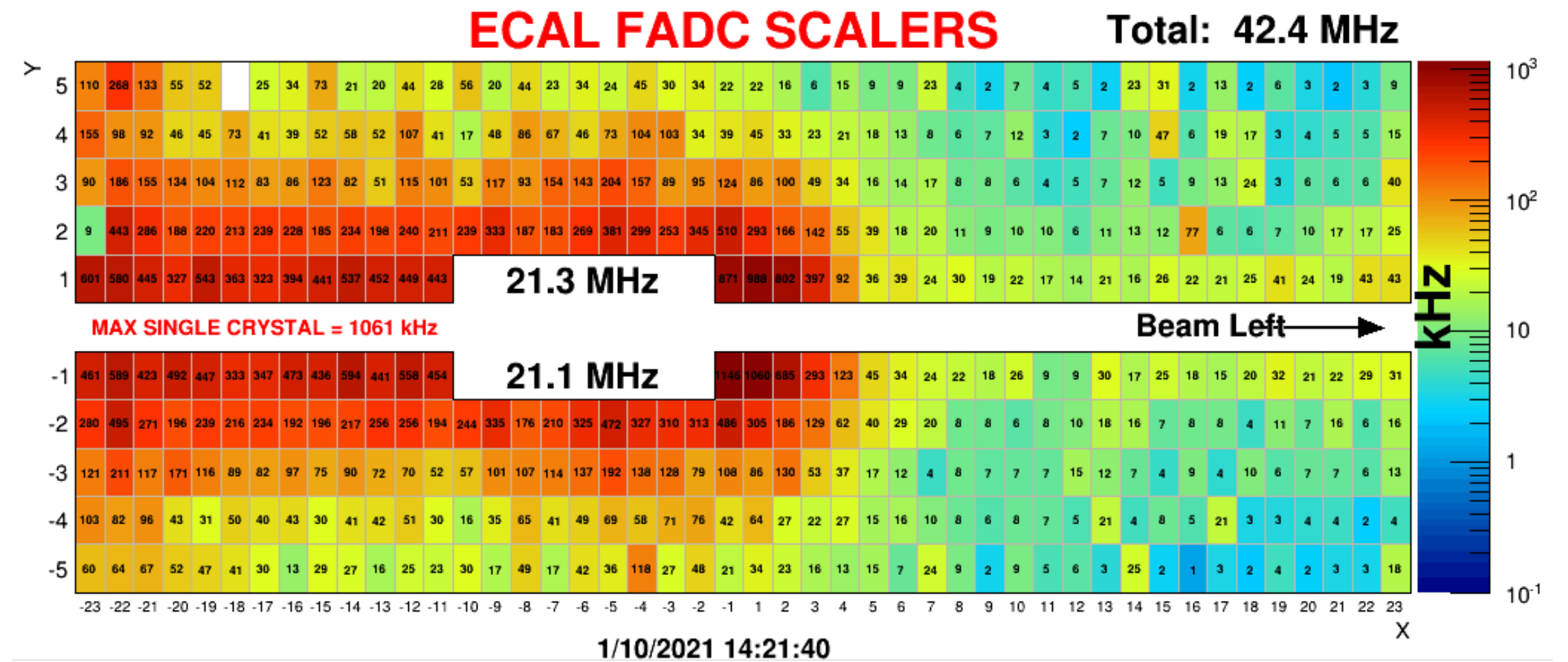
- 1st chiller failed a couple weeks before the run, 1st spare failed a couple weeks into the run, 3rd chiller lasted for the rest of the run ...
- **Nevertheless, tight cooling alarms and temperatures kept sufficiently stable throughout the run, unlike in 2019**

- Noise

- 25 MHz noise greatly escalated in the days prior to the run, much more than previous run periods, rendering scalars difficult to use for beam centering without target
- **Mostly suppressed it by reorganizing HV and signal cables, slightly raised thresholds on a few remaining extra-noisy channels**

- HV

- Replaced remaining motherboard bypasses with terminal blocks, for easier preamp replacement on those groups
- Circuit breaker trip early in the run period, brought down various services including ECAL HV crate
- Random, false HV trips started after that, instantaneous current jumps, uncorrelated with beam, with increasing frequency over time
 - **slightly increased trip and alarm delays over time to stop the annoyances**



HPS ECAL & HODO SLOW CONTROLS 10/01/2021 14:21:32 Hodoscope HV ALL ON ALL OFF Top Bottom

High Voltage

13 16 17 18 19 20 21 22 23 24 25 1 2 3 4 5 6 7 8 9 10 11 12

14 15 26

! ALL ON ! Controls

! ALL OFF ! Monitors

Interlock Status: [OK] [OK] [OK] [OK]

14 15 17 18 19 20 21 22 23 24 25 1 2 3 4 5 6 7 8 9 10 11 12

13 16 26

Low Voltage

Channel #1	Channel #2
P _v ON	P _v ON
OCP ON	OCP ON
UC ●	UC ●
Measured Voltage: 5.00	Measured Voltage: 5.00
Measured Current: 4.01	Measured Current: 4.01
Setpoint Voltage: 5.00	Setpoint Voltage: 5.00
Setpoint Current: 6.02	Setpoint Current: 6.00

Comms: NO_ALARM

Temperatures

Chan	Comm	Top	Bottom
1		66.0	66.1
2		66.8	65.8
3		67.3	66.8
4		66.9	65.4
5		67.7	66.1
6			66.2
7		67.7	66.2
8		67.1	65.8

! Strip Charts Top

! Strip Charts Bottom

ECAL Inlet 64.2

Chiller

COMM: NO_ALARM

Status: 0

Current Temp (C): 17.060

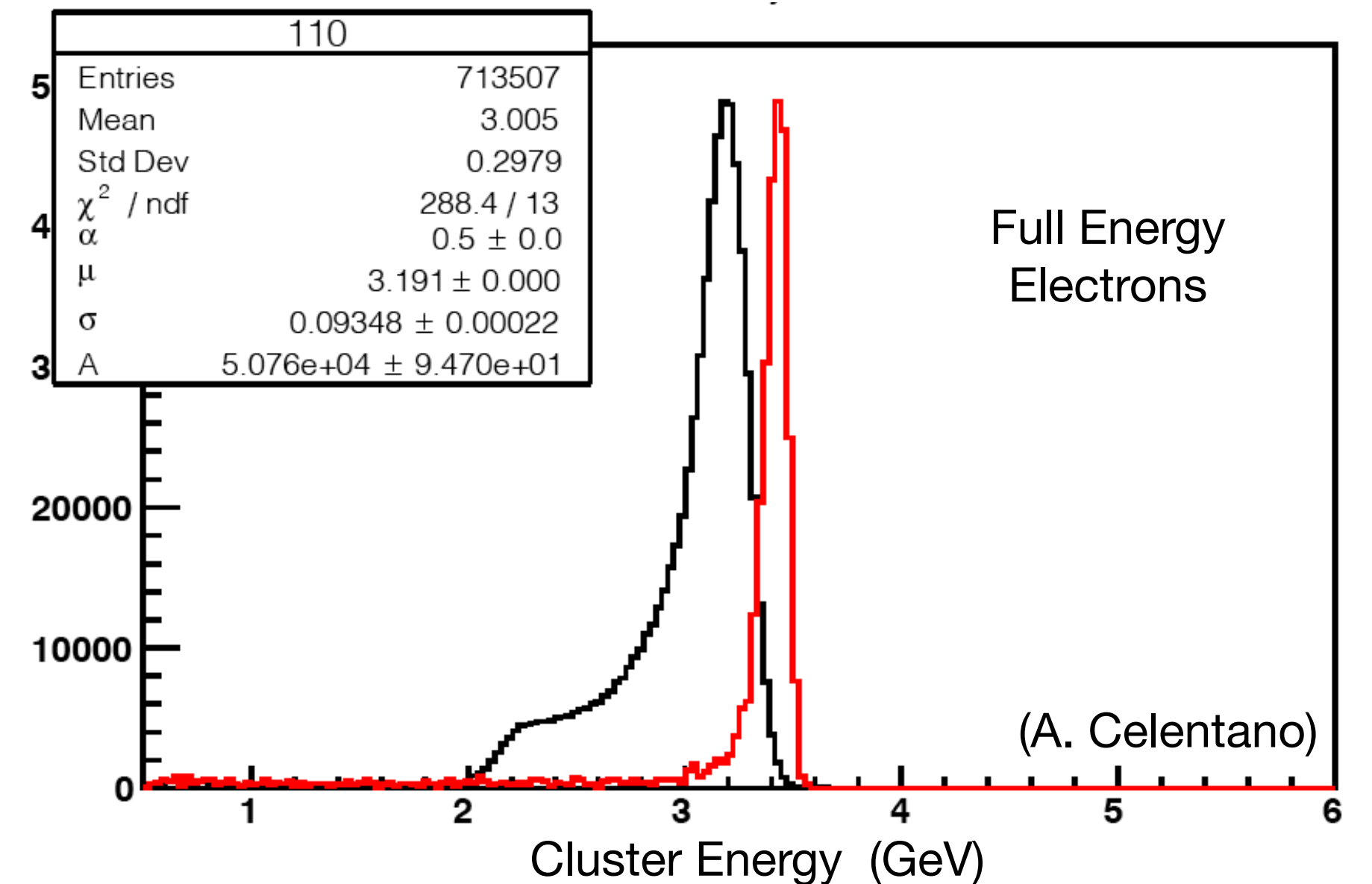
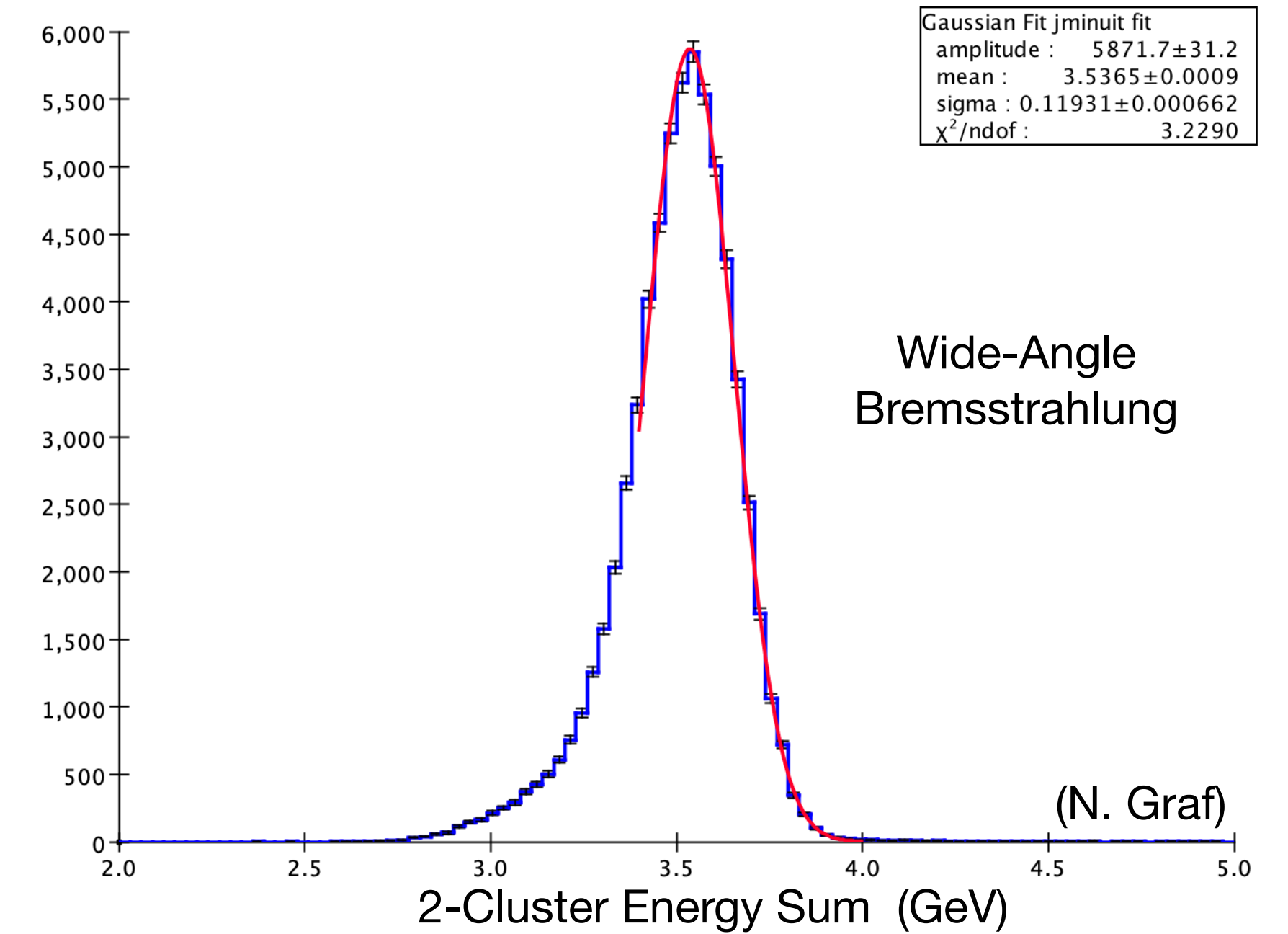
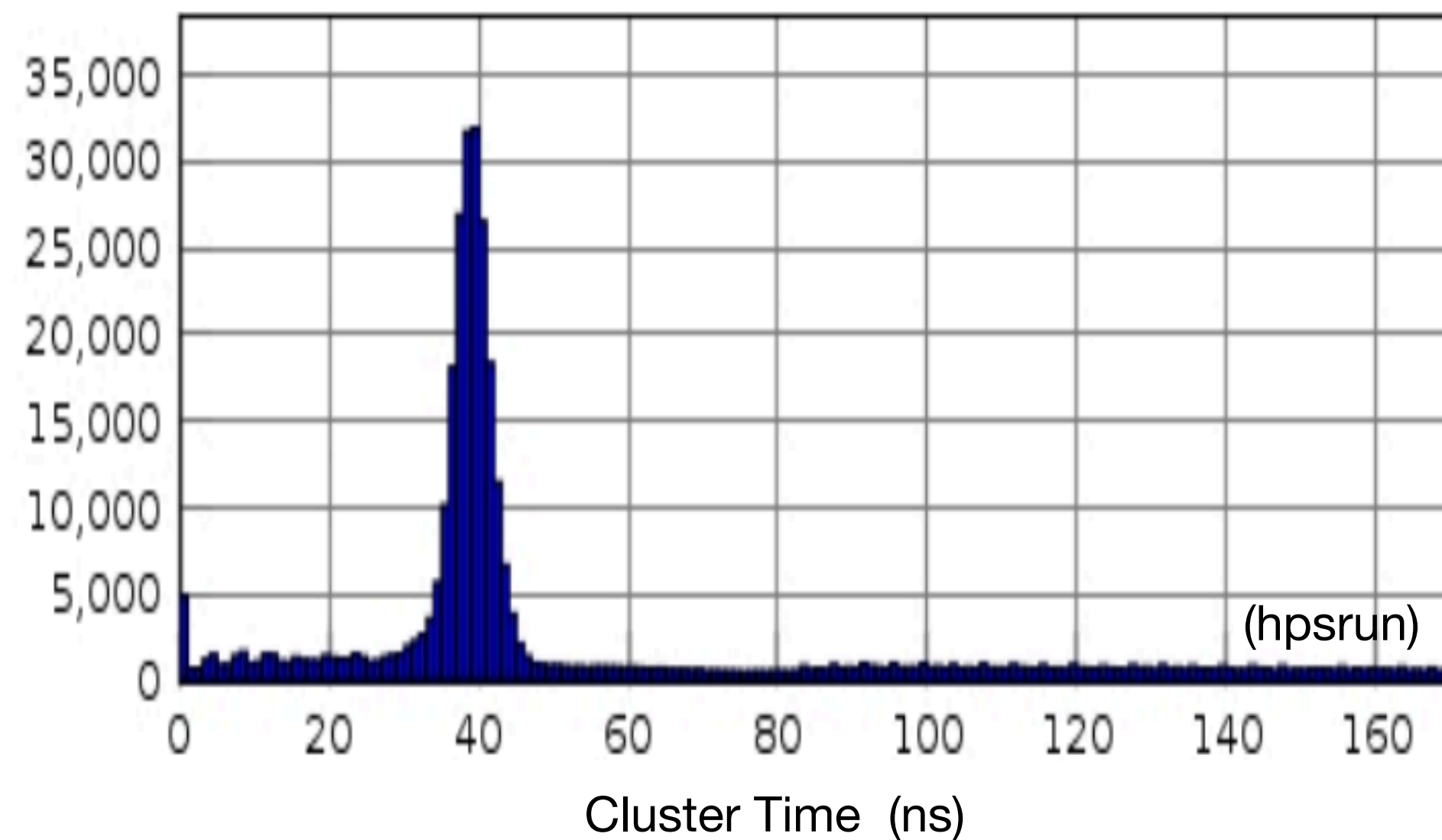
Setpoint: 17.0

Low Limit (C): 14.0

High Limit (C): 35.0

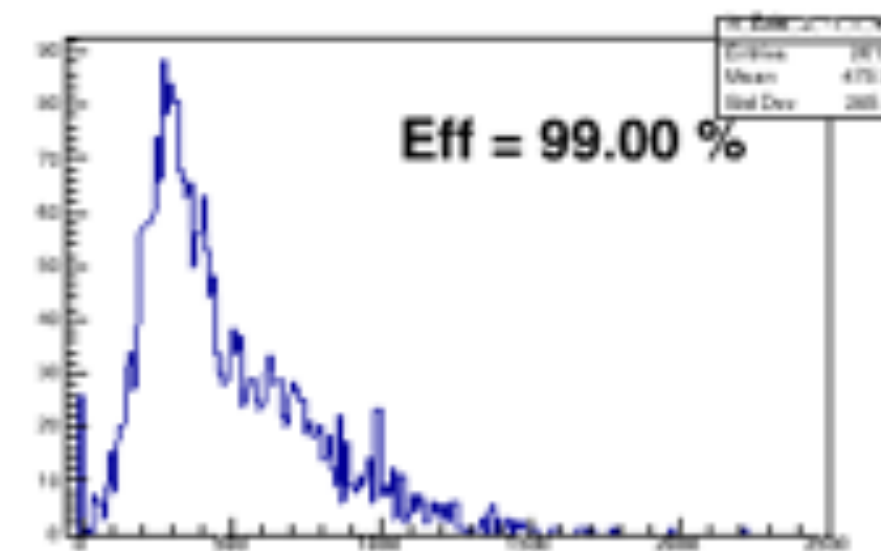
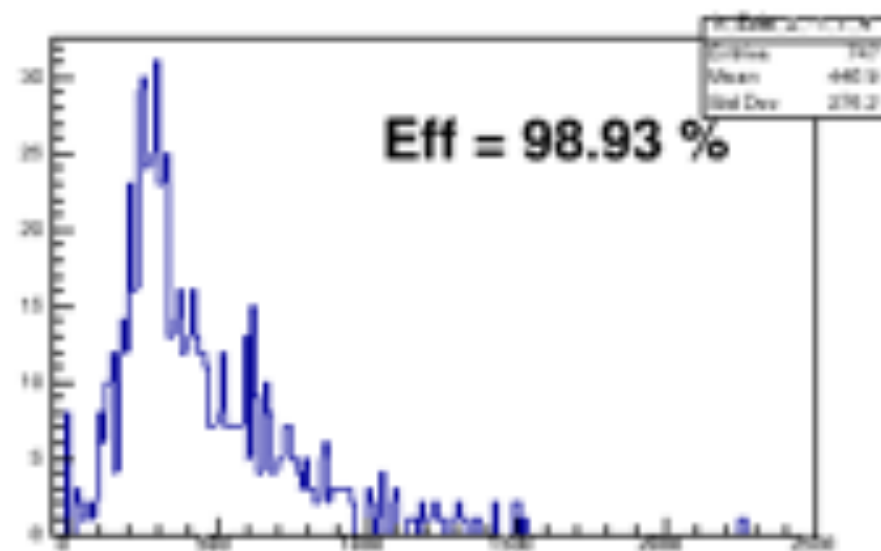
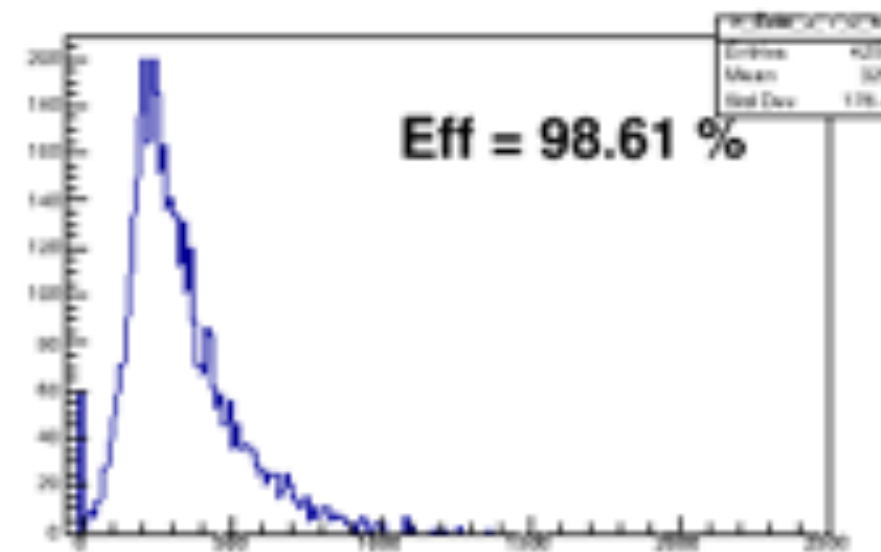
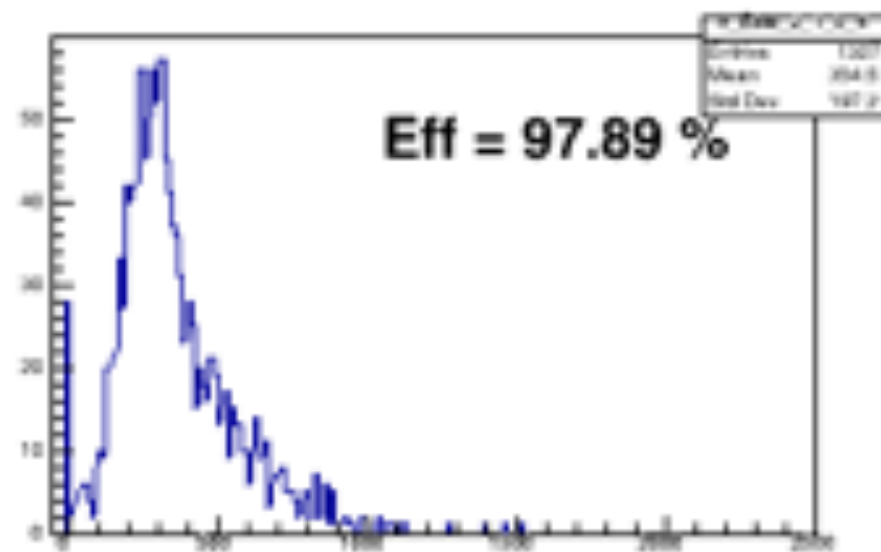
ECAL Performance

- Online gains were from end of 2019 run, with approximations for the replaced preamps, energy resolution as expected
- Raw timing resolution as expected
- Calibrations started

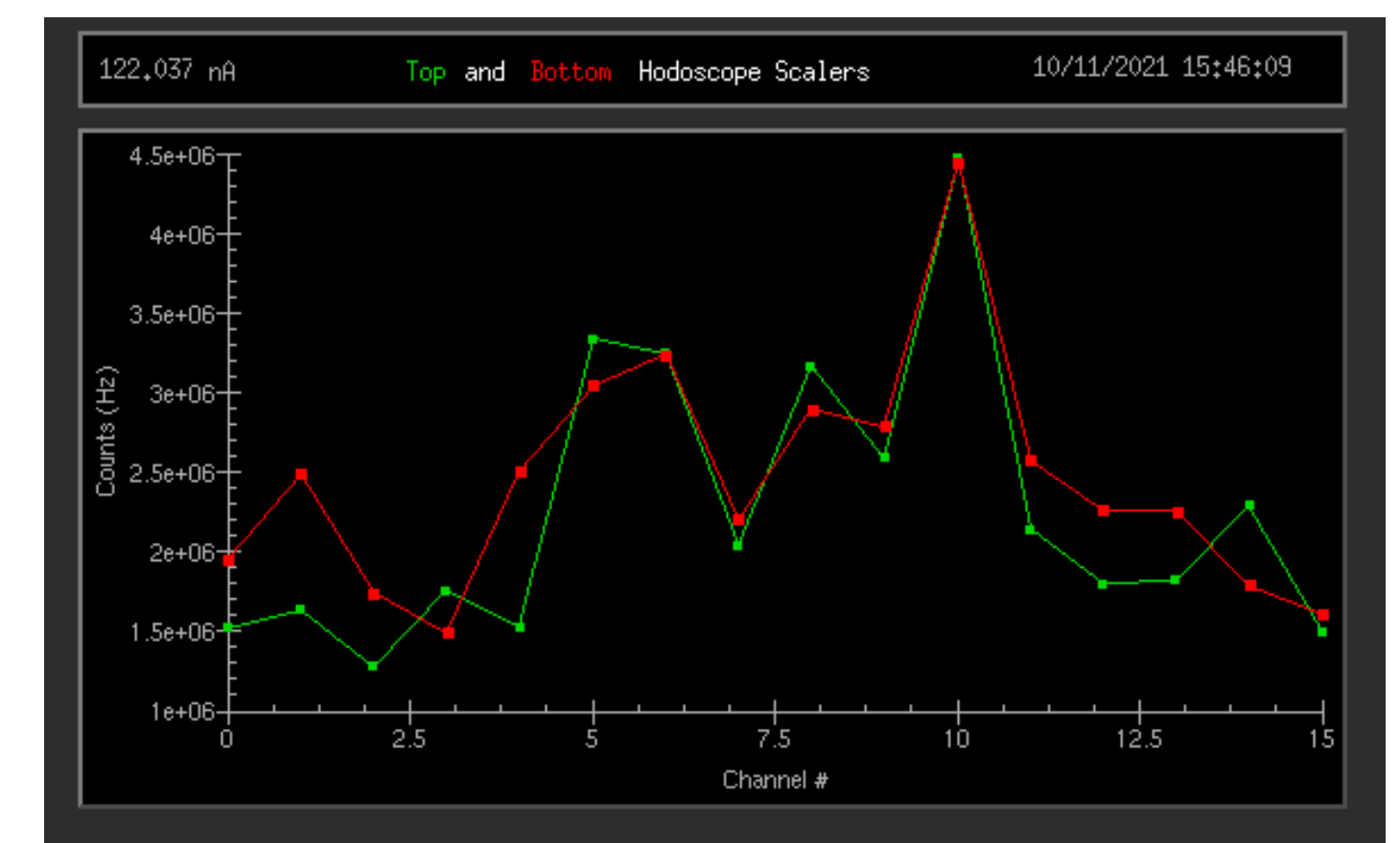
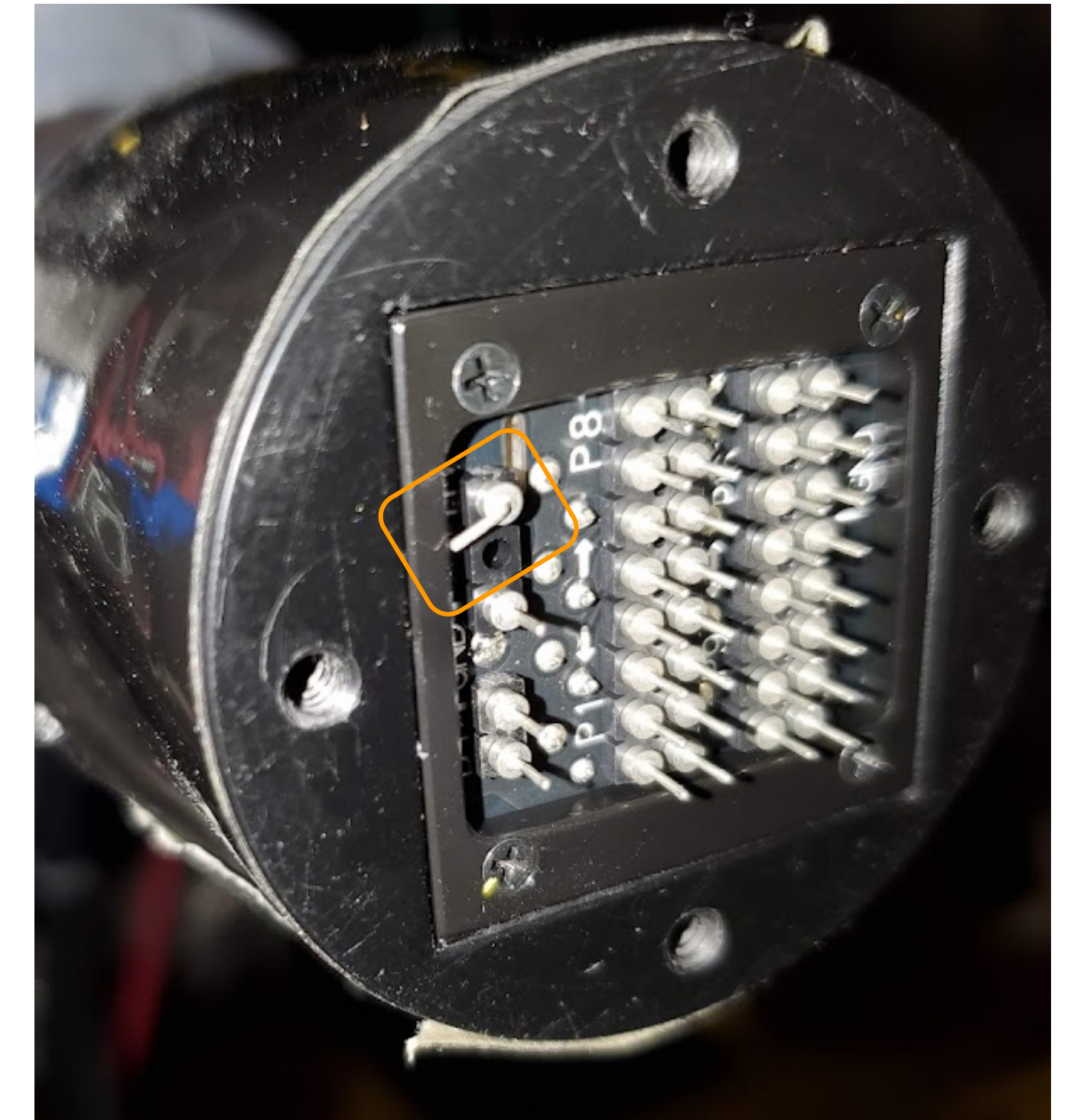


Hodoscope

- Mid-run work in the alcove somehow damaged HV pins
 - Resulted in intermittent changes in scaler and trigger rates
 - Discovered within a few days during scheduled downtime and PMT replaced
- Efficiency very good, used in coincidence with ECAL the trigger, in parallel with other ECAL-only triggers



- From R. Paremuzyan



Summary

- Overall operation and performance of ECAL and HODO was good
- No huge issues, data quality good, calibrations underway
- Issues addressed during the run
 - dying chillers, PMT damaged and replaced, false HV alarms