

76-Nov-2003

0:38 Gain changed to  $1 \times 10^6$   
0:38 Run #6460  $\alpha$  BB open  $\leftarrow$  Run comment <sup>of the file</sup> is wrong

0:40 Gain changed to  $2.5 \times 10^5$

0:41 Run #6461  $\alpha$  BB open

0:44 Gain  $4.6 \times 10^5$

0:46 Run #6462  $\alpha$  BB open

0:53 Run #6463  $\alpha$  beam 1886  $\mu$ A

$\sim$  1 min Beam Blocker closed. ( $\sim$  @ 15000 events)

1:00 Run #6464  $\alpha$ .

1:08 Run #6465  $\alpha$

1:15 Run #6466  $\alpha$

1:22 Run #6467  $\alpha$

1:35 Run #6468 pedestal

1:37 Run #6469 LED

1:44 Run #6470  $\alpha$  beam 1886  $\mu$ A

$\sim$  2 min

1:52 Gain changed to  $1 \times 10^6$

# Gain Adjustment to $1.0 \times 10^6$ gain <sup>16/Nov/2003</sup>

1:57 Run #6471 pedestal

1:59 Run #6472 LED

next\_hv\_ 6472

- Because HV adjust mode in online analyzer does not work yet, we decided to do the adjustment by using normal LED data
- The adjustment was done iteratively <sup>in each step</sup>. New HV setting file is created by "next\_hv" @ llc.psi.ch which utilizes the same algorithm as in the online analyzer.

loaded ~~next\_hv~~ next 6472.hv.

@ 1st iteration

2:25 Run #6473 pedestal  $\leftarrow$  wrong run mode.  
JUNK

coded by RS

2:26 Run #6474 pedestal

2:28 Run #6475 LED

$\leftarrow$  ADC #127 turned off/very low gain since this run.

@ 2nd iteration  $\sim$  loaded next 6475.hv "

2:55 Run #6476 pedestal

2:57 Run #6477 LED

@ 3rd iteration  $\sim$  loaded next ~~6477~~ 6477.hv.

3:23 Run #6478 pedestal

3:24 Run #6479 LED

@ 4th iteration  $\sim$  next 6479.hv.

3:45 Run #6480 pedestal

3:47 Run #6481 LED

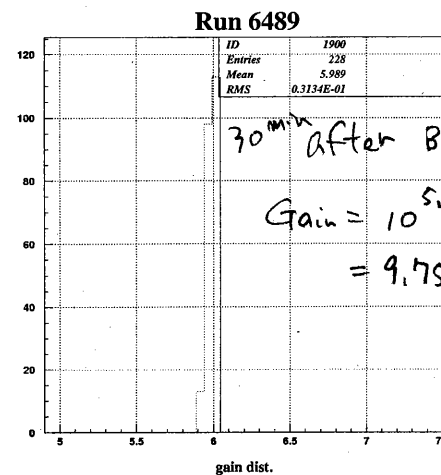
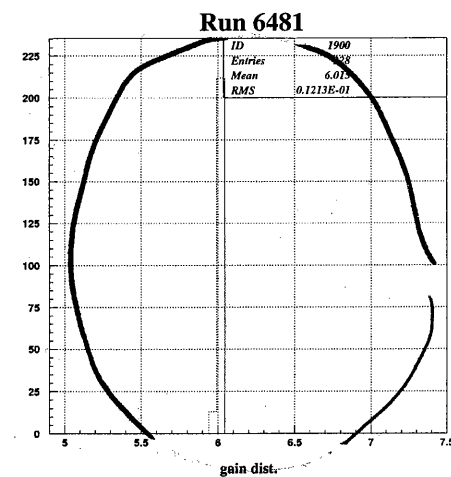
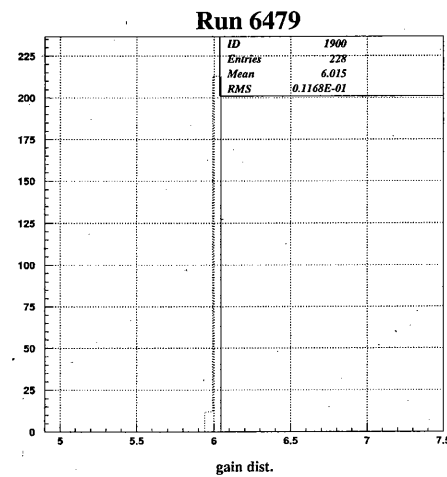
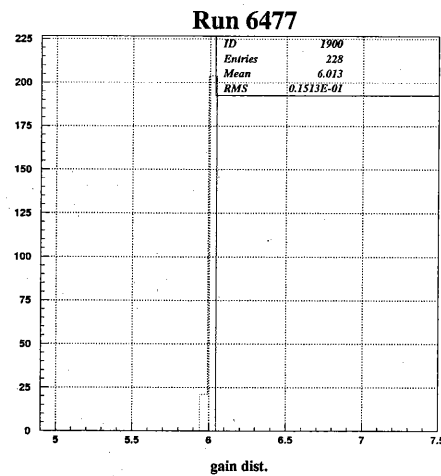
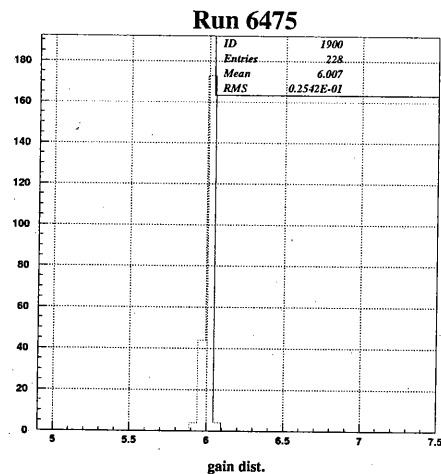
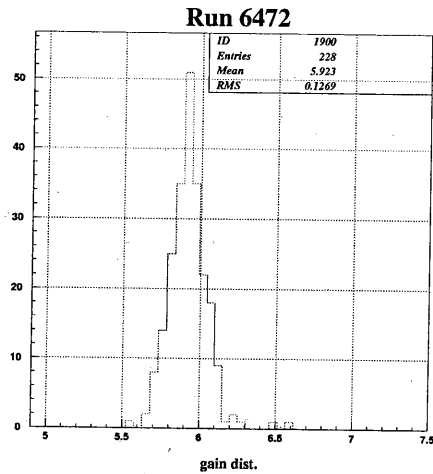
• B.B with new gain

• low intensity run. FSHS2 = 125

24 hours

• normal intensity run

Gain Adjustment finished // HV setting next 6479.kv  
 is saved as hvdata\_05-Oct-2003/1e6\_031116-new.kv



11V adjusted ↘

- 4:25 Run #6482 α, BB closed
- 4:32 Run #6483 α, BB closed, beam 1904 μA.
- 4:34 Beam Blocker Opened @ ~13000 events
- 4:40 Run #6484 α, BB open, beam 1906 μA
- 4:47 Run #6485 α, BB open
- 4:53 Run #6486 α, BB open, beam 1915 μA.
- 5:01 Run #6487 α, BB open, beam 1917 μA
- 5:09 Run #6488 pedestal, BB open, beam 1907 μA
- 5:10 Run #6489 LED, BB open, beam 1906 μA

5:20 FSH52 350 → 125.

Low Intensity Run

- 6:04 Run #6490 pedestal, BB open, beam 1914 μA.
- 6:05 Run #6491 LED
- 6:11 Run #6492 α
- 6:15 Run #6493 π<sup>0</sup> S1 \* NaI4 \* Lye (FSBK4)

beam 1914 μA.  
 S1 5.57 M/10<sup>6</sup>  
 S2 \* RF 5.44 M/10<sup>6</sup>

Request: 1.6 Hz.

trigger rate: 252 events / 3 min ⇒  $\frac{252-180}{180} \sim 0.4$  Hz

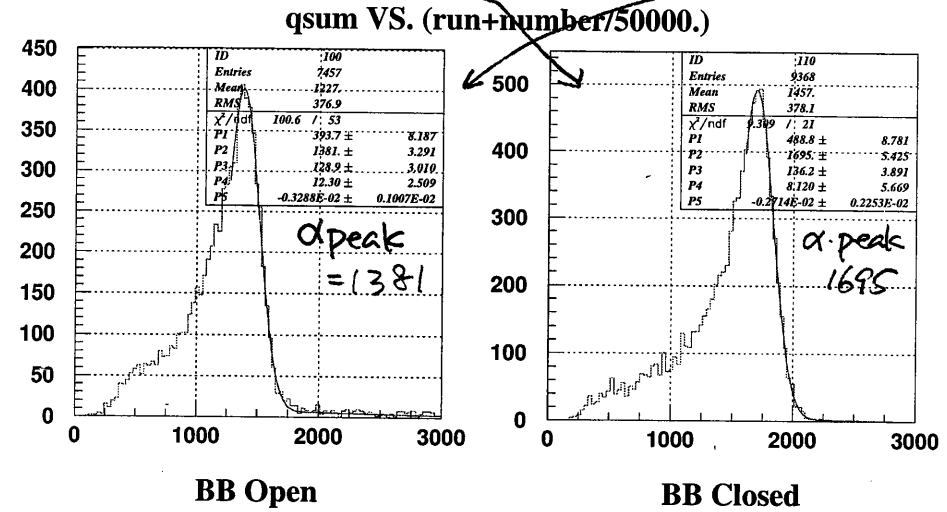
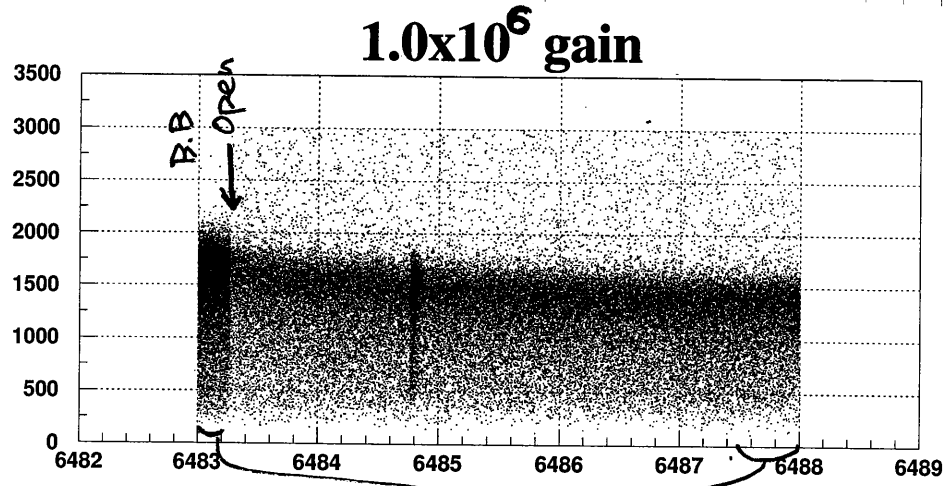
7:45 ~ 8:30  
~~8:00 ~ 8:45~~ Beam unstable.  
 8:30 ~ beam 18 mA.

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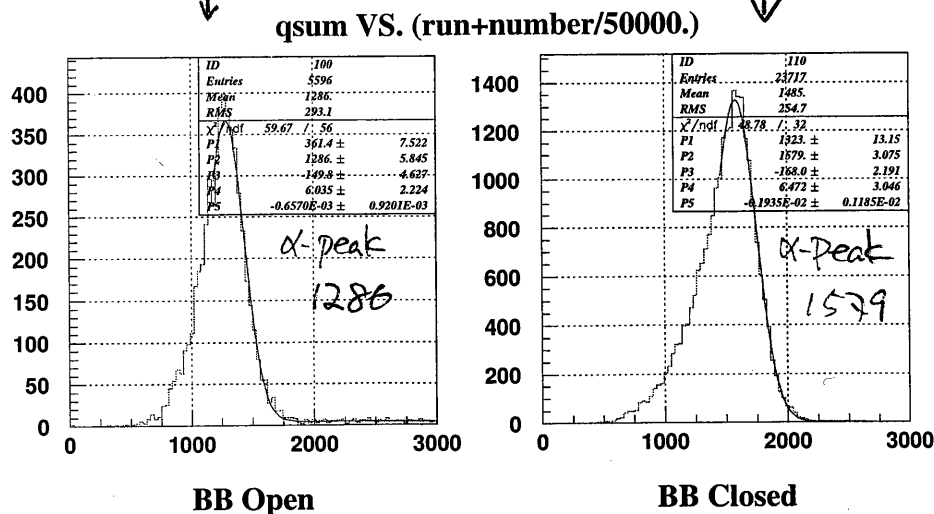
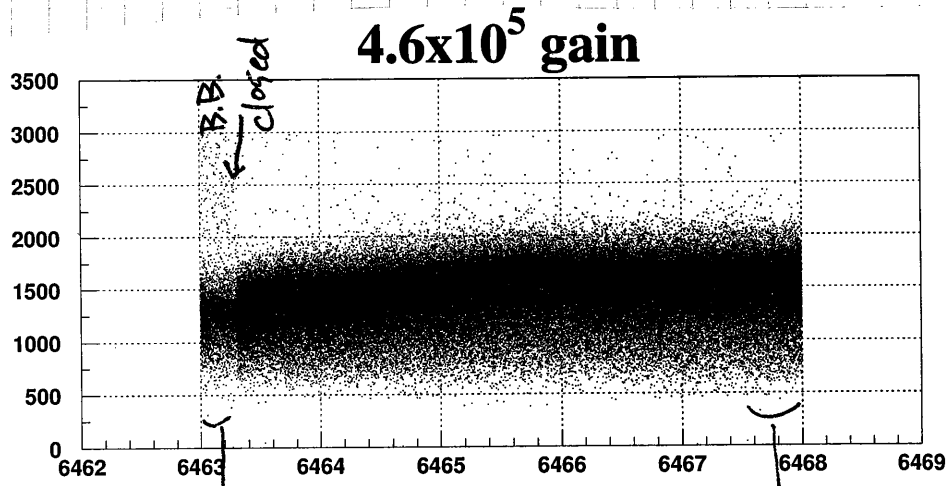
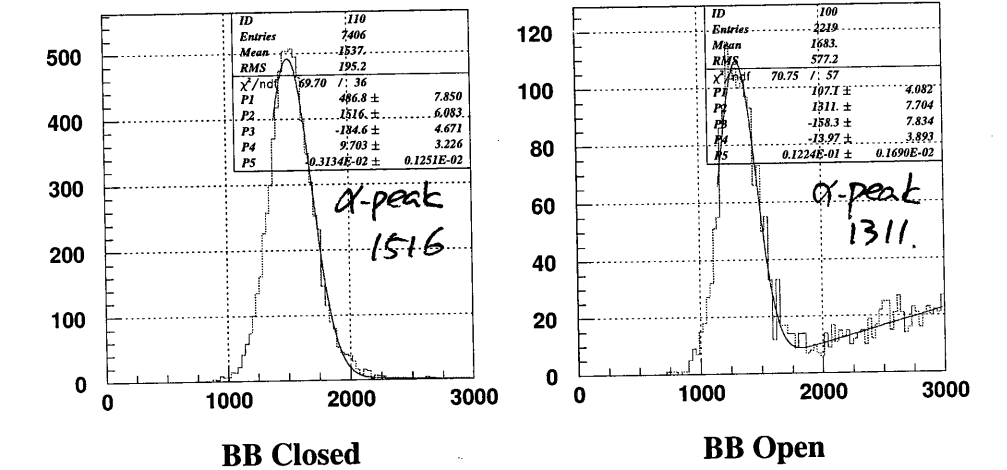
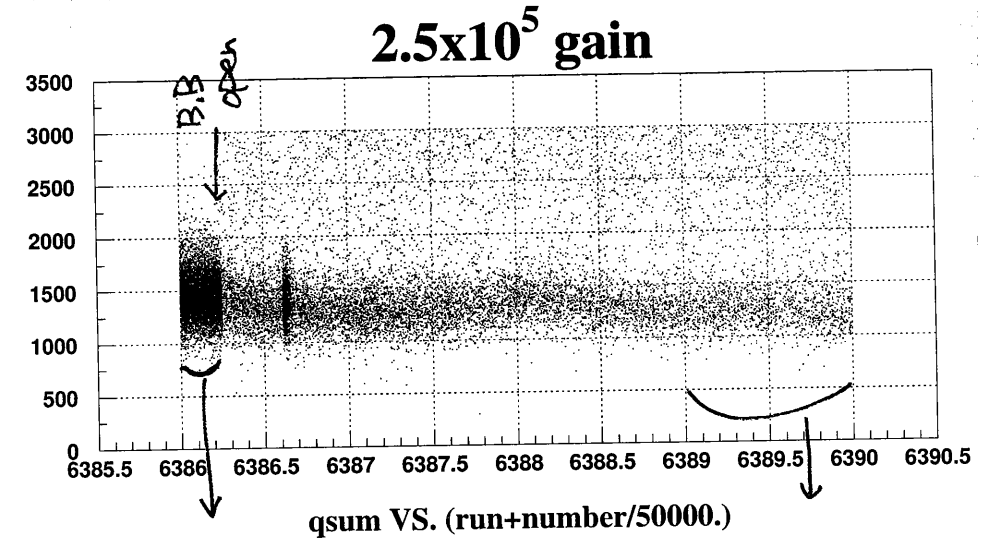
Beam Blocker  
Study  
Summary

Cuts:  $qsum < 3000$

position  
 $\left\{ \begin{array}{l} q < |x| < 13 \\ |y| < 2 \\ \text{or} \\ q < |y| < 13 \\ |x| < 2 \end{array} \right.$



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Gain	B.B open	closed	peak position shift ( $\frac{\text{open}-\text{closed}}{\text{closed}}$ )
$1.0 \times 10^6$	1381.	1695.	-18.5%
$4.6 \times 10^5$	1286.	1529.	-18.6%
$2.5 \times 10^5$	1311	1516	-13.5%
$2.5 \times 10^5$ w/ paraffine	1339	1800	-25.6%
$2.5 \times 10^5$ pb block	1395	1742	-19.9%

w/ paraffine  
 995 mm collimator  
 pb block  
 performed at 9/Nov.

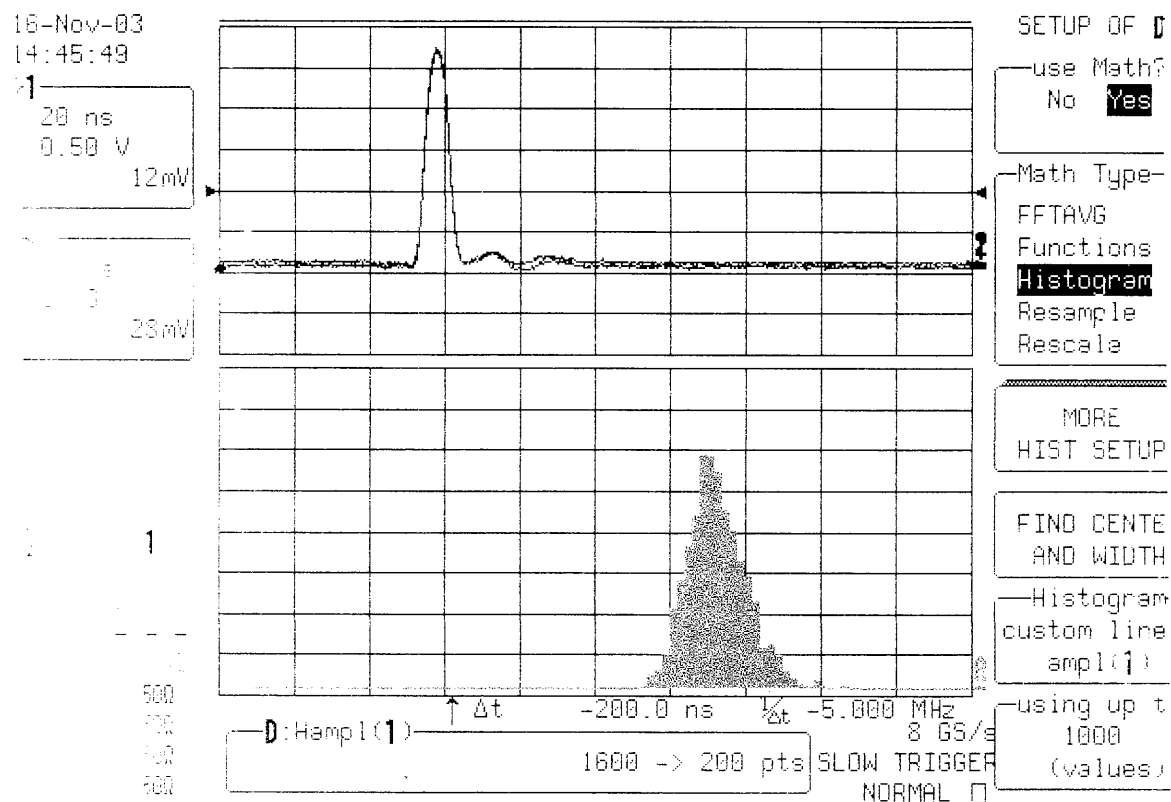
No significance difference in peak position shift for  $1.0 \times 10^6$  gain and  $4.6 \times 10^5$  gain.

The shift is smaller for  $2.5 \times 10^5$  gain

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9:16 SCFC tripped.  
 ↳ paused run, restart SCFE, resumed run.  
 12:00 Beam stop → next message with 3 pm  
 12:02 #6493 paused  
 12:23 stop 6493



Check of the stability of the LED driver output

14:00 Beam still down, let's proceed with calibrations.

Run #6494 Pedestal

Run #6495 LED 1+5

15:30 Beam coming back.

15:40 Run #6496 alpha run.

This run can not be used for normal alpha run.

This run can be used to check beam intensity dependence on light output. because this data is taken during beam intensity getting high.

Run #6497  
 15:50 alpha run. same as #6496  
 16:05 Run #6498 alpha same as #6496.  
 16:13 #6499 same as before  
 16:25 #6500 "  
 16:40 #6501 pedestal. beam on, circ. off.  
 16:40 #6502 LED @ 1&5 "  
 16:45 #6503 alpha @ 1&5 "  
 16:55 #6504  $\pi^0$  trigger S1 \* NaI4 \* LXe (FB BK 7)  
 proton 1875  $\mu$ A

run comment is wrong:  
 It is written as w/o beam but the beam is on.

trigger rate.

$$\frac{6687 - 5116s}{5116s} \approx 0.3 \text{ Hz}$$

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2:47 end #6504 ~ 47000 events  
 2:44 Run #6505 pedestal beam blocker open.  
 2:46 Run #6506 LED (1&5) beam blocker open  
 2:51 Run #6507  $\alpha$  beam blocker open  
 3:04 Run #6508  $\pi^0$  trigger S1 \* NaI4 \* LXe FB BK 7.  
 beam 1847  $\mu$ A

trigger rate

$$\frac{3762 - 2770s}{2770s} \approx 0.36 \text{ Hz}$$

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07:13 Run #6508 Stop. 20000 events taken. (4:09'16")

# of significant events = 20000 - 14940 = 5060 events.

Counting rate = 5060 / 14940 = 0.339 Hz.

07:12 Run #6509. pedestal run @ Beam ON.

Run #6510. LED calibration run @ Beam ON.

Run #6511.  $\alpha$ -ray run @ Beam ON.

07:35 Run #6512. resume taking the  $\pi^0$  events.

- Trigger: S1 \* (Fr3 + Br4 of Xe) \* (Center of NaI).

- Condition: circulation off. / collimator { Xe: 95mm / w/ Parafine.  
NaI: 40mm

DAC value of FSH52 = 125. (low intensity mode).

- Proton beam current: 1.848 mA.

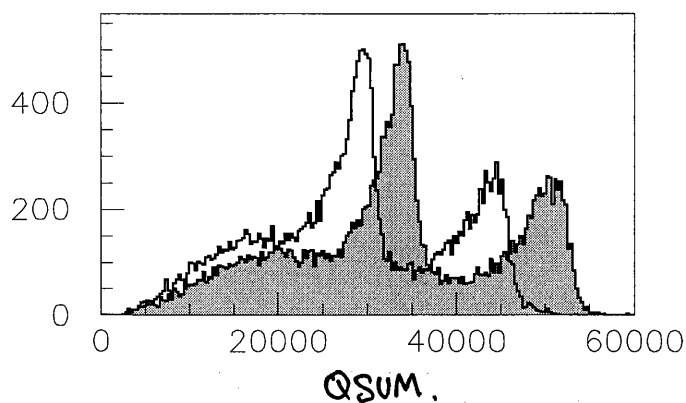
- Counting rate: 2073 events / 25'31"  
=  $\frac{2073 - 1531}{1531} = \underline{0.354 \text{ Hz}}$

At the end of Run #6508,

- We've taken the  $\pi^0$ -events data as "low intensity mode" @ 1e6,  
~ 23000 events in total. (#6493, #6504, and #6508).

- We need some more statistics of  $\pi^0$  triggered events for fine analysis,  
so we continue to take the  $\pi^0$  data for a moment.

Comparison between current data and previous condition:



▶ HATCHED: Current. (#6493 + #6504 + #6508)

- Low intensity (FSH52 = 125).
- after the Gain adjustment. to  $1 \times 10^6$ .

▶ No Hatch.: Previous (#6172 + #6178)

- High intensity (FSH52 = 350).

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08:36 No Beam.

#6512. paused.

09:57 Beam is coming back ~ 300  $\mu$ A.

We have to wait taking the data until its stability is confirmed.

10:18 Proton current reached full spec ~ 1850  $\mu$ A.

- Refrigerator status: Tset = 120.0. Tmean = 120.05. Hpower = 13.00%

10:18 Run #6512, resumed.

16:10 Run #6512 stopped. The beam has been off for 1 hour about  
due to problems with the cooling system.  
~ 20000 events taken

16:13 Run #6513 pedestal

16:14 Run #6514 LED

16:30 The message said "no beam before 10:00 pm"!!

16:34 Run #6515 alpha.

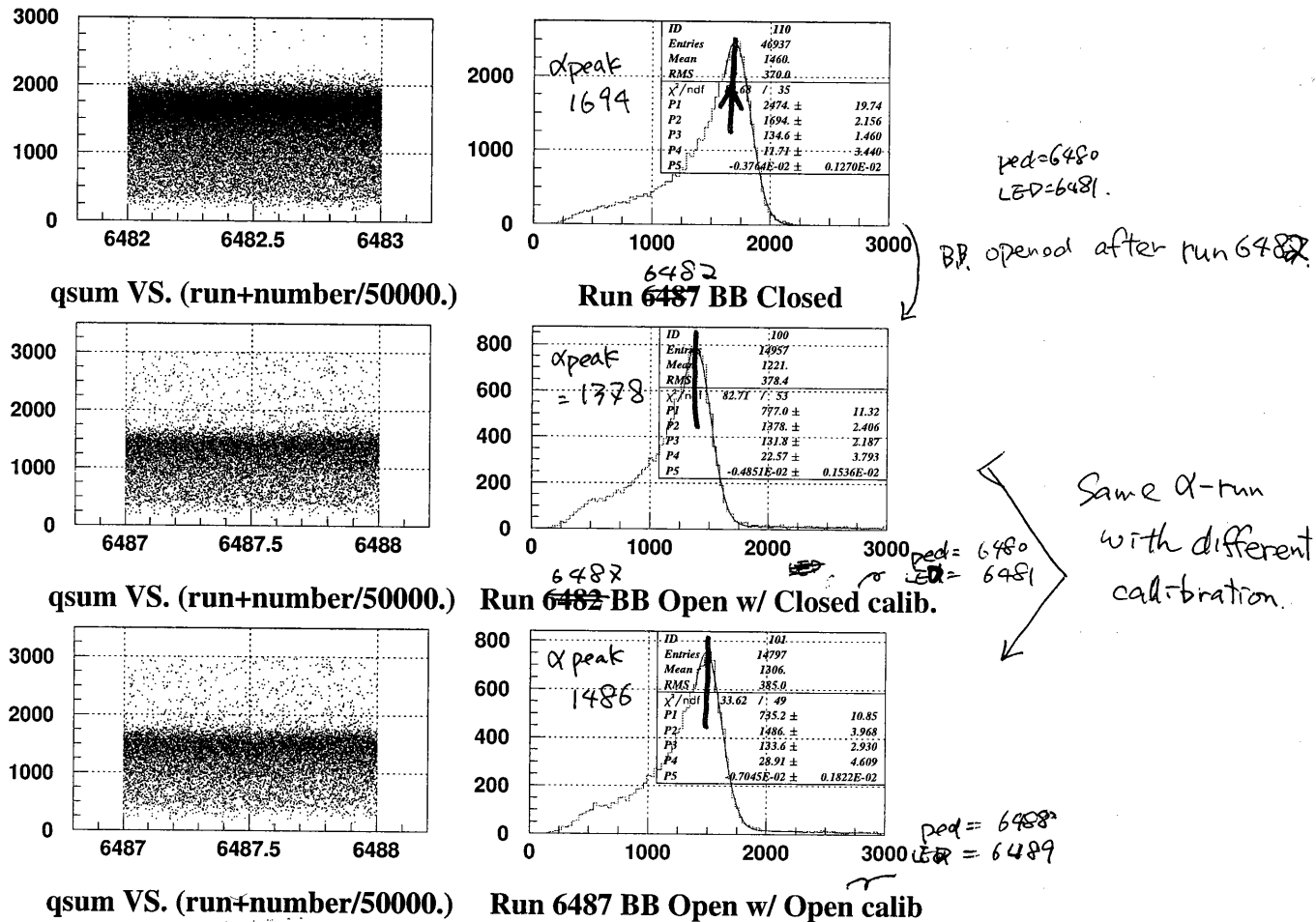
16:43 Run #6516 CR with no beam. circ. off.

Now,  $\pi^0$  events as "low intensity mode" @ 1e6  
(FSH52 = 125)

~ 32000 events in total (#6493, #6504, #6508 and #6512)

Beam is not so stable in some periods.  
usable data ~ 20000 evts

$\alpha$  peak position dependence on  
different calibration (before and after opening the  
B.B.)



Same  $\alpha$ -run  
with different  
calibration.

peak position of BB open data with BB open calibration  
is higher than that of BB open data with BB closed,  
but still lower than BB closed data.

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1:00 Beam is still unstable  
1:09 #6517 CR BB ~~LED~~ circ. OFF  
open  
⇒ not usable.

Saturation of  
photo cathode  
Breeder circuit  
Both are saturated?

2:07 No Beam for 1 hour. (Effectively no beam  
for the past 10 hours)

#6518 Junk.

3:50 Beam stable since ~2:00 @ 1600  $\mu$ A  
⇒ we restart taking data (10° gain & low beam intensity)

3:51 #6519 pedestal BB open  
#6520 LED BB open  
3:57 #6521 alpha

gain 10<sup>6</sup>  
FSH52 = 125.

4:03 #6522 S1 \* (NaI4) \* (Xe F8 BK4) proton 1700  $\mu$ A

Be careful!  
Beam was sometimes unstable during this run

4:27 proton stable @ 1720  $\mu$ A

6:30 Beam is still UNSTABLE

Things to do after beam is stable.

- Take another ~20K events for  $\pi^0$  (S1+NaI4 \* Xe F8 BK4) @ 10° gain & low beam intensity.
- Beam intensity scan @ low gain for further understanding of saturation effect.
  - At least 4 beam intensity points, say FSH52 = 350, 200, 125, 75
  - $\pi^0$  (S1 \* Xe) & alpha
    - lower the threshold
    - increase LED intensity
 (if needed)
- $\pi^0$  run @ low gain & low beam intensity

6:50 #6522 stopped

Beam looks stable @ 1870  $\mu$ A

6:51 #6523 pedestal 10° gain BB open FSH52 = 125  
6:53 #6524 LED

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7:00 # 6525.  $\alpha$  run @ Beam ON.

7:08 # 6526.  $\pi^0$  run @ Beam ON, same as #6522.

} ~5 hours. proton current: 1.801 mA.

12:01 Stop the RUN #6526.

12:02 RUN #6527. pedestal

RUN #6528. LED calibration

RUN #6529. Alpha.

12:25 RUN #6530  $\pi^0$  run, start again.

- Trigger = S2 \* (Center 4 of NaI) \* (Front 8 + Back 4 of Xe).
- Low intensity. (FSH2 = 125).
- Proton current: 1.802 mA.

Refrigerator status:  $T_{set} = 120.0$  /  $T_{meas.} = 120.00$  /  $H_{pump} = 11.95\%$

17:40 Run #6530 stopped by 30000 event limit.

$25984 \text{ (total)} - 19683 \text{ (s)} \approx \frac{6000 \text{ events}}{\pi^0}$

17:55 Run #6531  $\pi^0$  run same as #6530.

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0:30 # 6531 stopped for calibration @ 31631

# 6532 pedestal -BB open circ OFF

0:31 # 6533 LED "

$\pi^0$  events  
31631 - 23700  
= 7931 evts

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0:37 # 6534 alpha BB open circ. OFF  $3 \times 10^4$  evts.

0:42 # 6535  $\pi^0$  run same as #6531

proton 1824  $\mu$ A

$\Rightarrow$  6:53 stopped  $\pi^0$  events  $\frac{30000 - 22260}{1000} = 7740$  evts

7:00 # 6536 ~~stop~~  $\pi^0$  run same as before

7:36 Stop the RUN #6536.

7:37 RUN # 6537 pedestal.

# 6538 LED.

# 6539 alpha

- In this beam period, we've continued to take the data at low intensity mode,

• We already accumulate enough statistics of data.

•  $\pi^0$  RUN @ low intensity mode are as below:

(RUN #6493, #6504, #6508, #6512, #6522, #6526) ~~###~~  
#6530, #6531, #6535, #6536.

~ 60000 events, ---- pedestal cut only (ttdc(147) > 50.).

(However, during this beam period, the beam was unstable several times, so you have to be careful at this point.)

12:40 DAQ temporarily modified to flash LEDs during  $\alpha$  runs. The idea is to have a low-intensity light source inside the detector and to check the behaviour of the  $\alpha$ -peak as a function of the light intensity and/or the pulsing rate.

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Beam Intensity dependence Study @ very low gain:  $2.5 \times 10^5$

2.9 HN

- 07:57 Low Gain High Voltage setting file (1e6-100v\_031115.hv) loaded.
- 07:59 DAC value of FSH52 set to 350. (← High intensity, original value).

- We have to wait for a moment until both conditions are stabilized, high voltage, PMT, and beam condition, background... and so on.

The last "low gain" high voltage setting file was created before Gain Adjustment. So, I create new "low gain setting file" as "1e6-100v\_031119.hv" in usual folder.

08:06 New low gain high voltage file loaded.

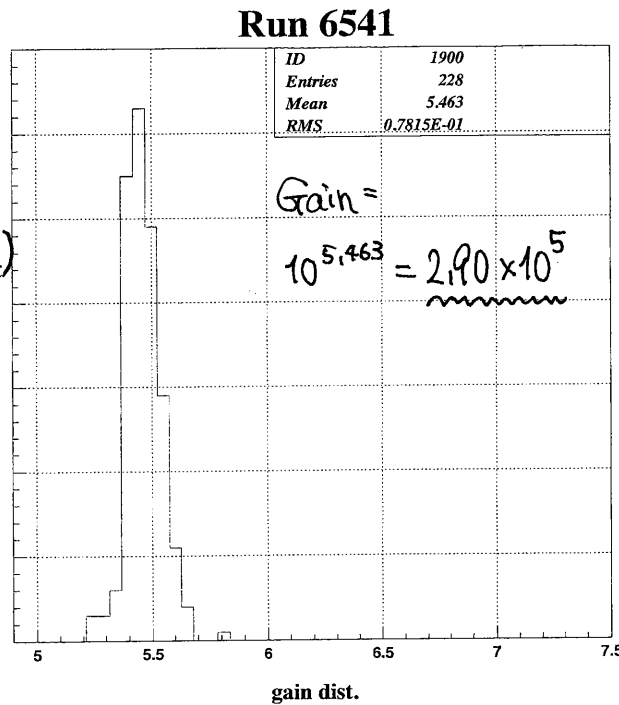
40 min. ....

- 08:46 RUN # 6540. pedestal @ 1e6-100v. Beam ON as high rate.
- 08:47 RUN # 6541. LED calibration run @ 1e6-100v. FSH52=350.
- 08:48 RUN # 6542. Alpha ray run @ 1e6-100v.
- 09:16 RUN # 6543.  $\pi^0$  run ( $N_i * (K_e F^8/B_4)$  - trigger).

09:19 FSH52: Set to 300. Si rate:  $15.7 M / 10^5$  proton. Proton current = 1.85 uA.

- 09:29 RUN # 6544. pedestal.
- 09:30 RUN # 6545. LED.
- 09:31 RUN # 6546. Alpha.
- 09:32 RUN # 6547.  $\pi^0$  run ( $N_i * K_e F^8/B_4$ )

Gain =  $2.9 \times 10^5$



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09:52 FSH52: Set to 250.

proton current: 1.852 uA. / Si rate:  $1.32 M / 10^5$  proton.

- 10:04 RUN # 6548. pedestal.
- 10:05 RUN # 6549. LED.
- 10:06 RUN # 6550.  $\alpha$ .
- 10:07 RUN # 6551.  $\pi^0$ . ( $N_i * (K_e F^8/B_4)$ )

← Suddenly, Analyzer down → restart.

10:20 FSH52: Set to 125.

proton current: 1.853 uA / Si:  $0.62 M / 10^5$  proton.  $6.21 M / 10^6$  proton.

- 10:28 RUN # 6552. pedestal
- 10:29 RUN # 6553. LED.
- 10:30 RUN # 6554.  $\alpha$ .
- 10:31 RUN # 6555.  $\pi^0$  ( $N_i * (K_e F^8/B_4)$ ).

10:44 FSH52: Set to 75.

proton current: 1.858 uA. / Si rate:  $2.52 M / 10^6$  proton.

- 10:50 RUN # 6556. pedestal
- 10:51 RUN # 6557. LED
- 10:52 RUN # 6558.  $\alpha$ .
- 10:53 RUN # 6559.  $\pi^0$ . ( $N_i * (K_e F^8/B_4)$ ).

11:18 Stop the Beam intensity study due to modify the refrigerator system for lig. Xenon by Dr. Tom.

09:28 VME TDC Test & Replacement of helium gas of the refrigerator.  $1 \times 10^6$  HV setting is loaded! (1e6-031116.hv)

RUN # 6560. ⇒ Test.



# Fig. 10M'S Note

@ PSI.

Control

11:10  $T_c = 170.07K$ ,  $T_{set} = 170K$   $P_{heater} = 14\%$

↑ just before He gas purge.  
(No buffertank this time)

11:32 - Comp → 2 valves off ( $T \rightarrow P$ )  $P_{set} \rightarrow LN_2$  auto.  
- Cold head is  $T_{set} = 290K$ .

11:33 Comp  $\overline{EIT}$  off.  
Comp  $P = 14.5$  bar

11:36  $V_v$  close,  $V_p$  open

11:45  $\overline{EIT}$  test, He gas purge

11:47 Cold head  $T_c = 294K$ ,  
 $V_v$  open  $\overline{EIT}$   $V_p$  is 7 bar

11:54  $\overline{EIT}$  ON.  
Comp is 4 bar

Gas composition:  
Helium 6.0  
 $O_2 < 0.5$  ppm  
 $N_2 < 0.5$   
 $H_2O < 0.5$   
 $H_2 < 0.5$   
 $CH_4 < 0.1$   
 $CO/CO_2 < 0.1$   
 $Ne < 0.5$

11:57 Pump 4 bar  
He gas purge

12:00  $\overline{EIT}$  ①  $V_v$  open  $\overline{EIT}$   $V_v$  close,  $V_p$  open  
~4 bar

12:06  $\overline{EIT}$  ~14 bar

12:07  $\overline{EIT}$  ~4 bar

12:15  $\overline{EIT}$  ②

12:18  $\overline{EIT}$  ~14 bar

12:23  $\overline{EIT}$  ~4 bar ③

12:25  $\overline{EIT}$  ~14 bar

12:30  $\overline{EIT}$  ~4 bar ④

12:32  $\overline{EIT}$  ~14 bar

~ He gas purge ~5

12:33  $T_{set} \rightarrow 170K$

⊛ 4 times He gas purge & change

12:35  $T_{set} = 170K$  Comp ON (Remote)  $P_{comp} = 17.5$  bar

12:51  $T = 170K$   $P_{comp} = 16.5$  bar → change on operation

14:21 Heater power 14% @ 170K  
 $P_{comp} = 19.2$  bar

14:30  $P_{comp} = 20$  bar on operation

14:48  $T_c = 169.9K$ ,  $P_{heater} = 35\%$

15:00  $T_c = 169.9K$   $P_{heater} = 38\%$   $P_{comp} = 20$  bar

15:50  $T_c = 169.9K$   $P_{heater} = 37\%$   $P_{comp} = 20$  bar

16:00  $T_c = 169.9K$   $P = 37.8$   $P_{comp} = 20$  bar

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7:40  $T_c = 170.0K$   $P_{heater} = 45\%$   $P_{comp} = ?$

$P_{dewar} = 0.116$  MPa, Cold head -103

\* ADDITIONAL SIGNAL REQUIRED:  
• Compressor Pressure  
• Water Temp / flow rate.

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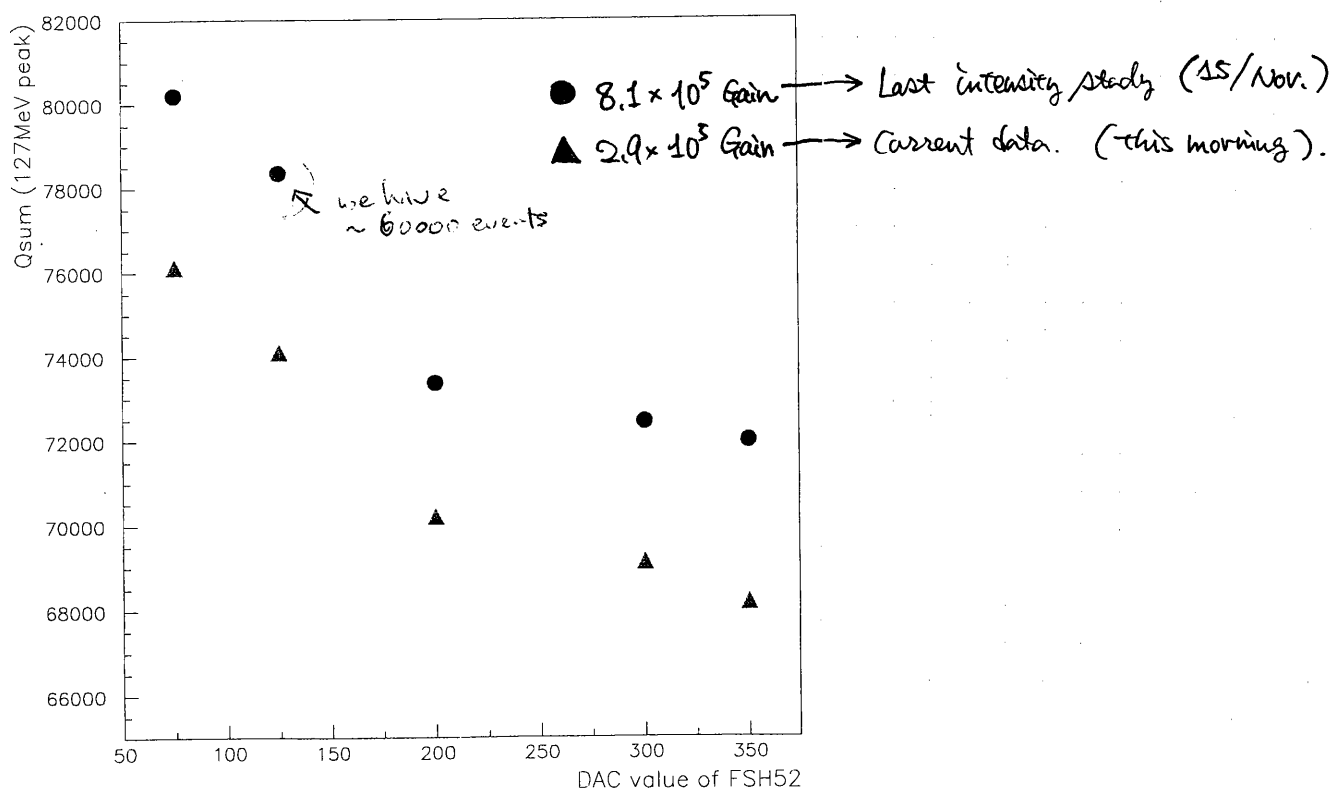
16:03  
 RUN # 6561. pedestal @  $2.9 \times 10^5$  Gain. Beam Blocker CLOSED.  
 RUN # 6562. LED.  
 RUN # 6563.  $\alpha$ .  
 RUN # 6564.  $\pi^0$  (Si \* Xenon (F:8) B:4).  
 → NO! High voltage setting is wrong!

1e6-100V-031119.kv loaded. (16:05) ⇒  $2.9 \times 10^5$  Gain.

} waiting for a moment.

16:45 Run # 6565 pedestal @  $2.9 \times 10^5$  Gain Beam Blocker CLOSE  
 Run # 6566 LED  
 Run # 6567 alpha  
 Run # 6568  $\pi^0$  (Si \* Xenon (F:8) B:4)

► Gain comparison plot @ Beam Intensity study.



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19:00 Network card @ pstmp17 was replaced to "SL401 CARD" and HV control cable, ~~from~~ are moved from Peter's PC to pstmp17. for NaI & cosmic ray counter

we can access LRS1450A from "COM7" in pstmp17. but. midas doesn't recognize this COM7 port.  
 → should ask Stefan.

for the time being, we will monitor NaI HV by manually.

21:00. beam is getting stable. → 22:00. area closed.

22:20 Pedestal @  $2.9 \times 10^5$  Gain, Beam Blocker OPENED.  
 Run # 6569 FSH52: Set to 125.

proton current: 1863  $\mu$ A

22:30. LED Run # 6570

22:35 alpha. Run # 6571

22:45  $\pi^0$  (Si \* Xe (F:8) B:4) \* NaI center) # 6572.  
 low gain & low intensity run ↑  
 (2.9e5) (FSH52:125) Junk.

→ trigger setting was wrong, stopped.

22:45 Run # 6573.

$\pi^0$  run. same as #6572.

CFD threshold for Lxe F8Bk4 trigger was lowered during the run  
 $-0.14 \text{ V} \rightarrow -0.01 \text{ V}$ .

originally. the rate was below 0.1 Hz.  
 after changing CFD threshold, the rate became 0.3 Hz.

23:50 Run # 6573 stopped. (test run).

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23:50 Run # 6574  $\pi^0$  ( $S1 * Xe^{(F8)}_{BK4} * NaI 4$ )

low gain  $2.9 \times 10^5$   
low intensity FSH52: 125

$Xe^{(F8)}_{BK4}$  CFD threshold - 0.01 V

00:54 Run # 6574 ends 1660 events (including pedestal) events

01:07 Run # 65745  $\pi^0$  ( $S1 * Xe^{(F8)}_{BK4} * NaI 4$ )

low gain  $2.9 \times 10^5$   
low intensity FSH52: 125

02:47 Run # 65745 ends 2400 events (..)

Take Arbitration data

2:48 Run # 6575 Pedestal with current setting (Beam ON, of course)

2:52 Run # 6577 LEA 125

3:00 Run # 6578 d.

As is reported in ELOG by Stefan, VME TDC is nearly (but only 3 out of 4) so TDC delay cables are modified and analyzer was updated so that correct channel names can be shown in the histogram titles. The VME TDC raw data were stored in VTDC bank and converted TDC values to nsec unit are filled in TTDC bank by analyzer. On-line analyzer TTDC bank is filled as shown in the next page.

3:24 SM

In addition TDC online histogram range was changed from 0-128 nsec to 0-160 nsec since these VME TDCs have 140 nsec range.

3:25 SM

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3:10 Run # 6579  $\pi^0$  ( $S1 * Xe^{(F8)}_{BK4} * NaI 4$ )

low gain  $2.9 \times 10^5$   
low intensity FSH52: 125

5:27 Run 6579 ends 3029 events

TTDC BANK	CORRESPONDING RAW DATA BANK	Hardware TDC	Hardware Discriminator	Cable ID
COMMON START 0	0	FASTBUS TDC	CRATE0 ST 2	1
25 psec LSB 63	FTDC 63	slot 21	4, 6, 8	2, 3, 4
COMMON STOP 64	0	CAMAC TDC	CRATE0 ST 10	9
25 psec LSB 127	CTDC 64	CRATE0 ST 19~22	12, 14, 16	10, 11, 12
COMMON START 128	65	CAMAC TDC	CRATE ?	LEMO Cables
25 psec LSB 143	CTDC 80	CRATE0 ST 23	?	
COMMON START 144	0	VME	CRATE 1 ST 2, 3, 5, 6, 8, 9, 11	5, 6, 7, 8, 13, 14, 15
35 psec LSB 241	VTDC Variable	address 0~3 (left to right)		

20 Nov 03 SM.

5:29 (No Beam FOR THESE 5 minutes No Announcement yet

5:35 Beam is back

5:35 Run 6580  $\pi^0$  ( $S1 * Xe^{(F8)}_{BK4} * NaI 4$ )

low gain  $2.9 \times 10^5$   
low intensity FSH52: 125

5:22 Run 6580 ends ~3000 events

6:10 Offline analyzer on /afs/psa.ch/projects/ana1... is modified to incorporate with VTDC bank. Also, analyzer ch "N-VTDC" added. N-VTDC = N-FTDC + N-CTDC + N-VTDC

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~21:70 Pressure of the Inner Vessel raised to ~ 0.8 MPa

⇒ This was found to be fake later

~ 2:30 Irregular pressure (Inner vessel) was found to be due to something unstable in the blue controller box located near the purifier.

After fixing this problem, the pressure gauge was tested by switching on and off the refrigerator.

Now it is working and pressure value is monitored on the Labview window.

2:50 OK. Pressure (Inner vessel) is stabilized.

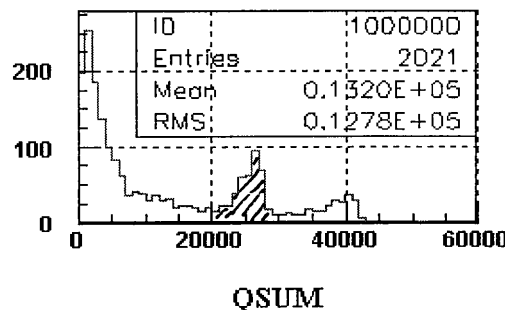
Beam Blocker OPENED

The beam line magnet control PC was disconnected from the network → connected again. "mag111pi2deg.set" is loaded & FSH52 = 75

3:10 #6590 Pedestal BB open FSH52: 75 gain  $10^6$   
 3:11 #6591 LED " (1e6-031120.kV)  
 3:18 #6593 ~~alpha~~  
 3:25 #6594  $\pi^0$  run S1 \* NaI4 \* Xe F8 BK4  
 TRIGGER RATE 0.36 Hz proton 1840  $\mu$ A

About 20% of events are in 55 MeV peak.

Effective rate for 55 MeV  $\gamma$   
⇒ 0.07 Hz



In total in this run 4900 events

#6592 doesn't exist

~~6595~~ RUN 6595 Pedestal  
 RUN 6596 LED  
 RUN 6597 d.

SCFE error. "cannot connect to MSCB device psTemp13"  
Restart the PC and MSCB CRATE → OK. Fixed

8:06 RUN 6598  
 $\pi^0$  RUN S1 \* NaI4 \* Xe F8 BK4  
 proton 1830  $\mu$ A

We found Analyzer and SCFE stopped during this run (~ 9:15)

⇒ stopped #6598 and restarted Analyzer & SCFE

9:28 Run 6599 same as #6598

9:52 6599 end ~500 events

New Raw ADC Bank added "ADC1"  
 frontend.c is modified (Read section of CIA) for this and analyzer.c also correspondingly.  
 The bank contains X8 amplified ADC data of each channel. In principle contents are same with those in ADC0 but with higher resolution. (x8). Check the bank contents with taking  $\pi^0$  data.

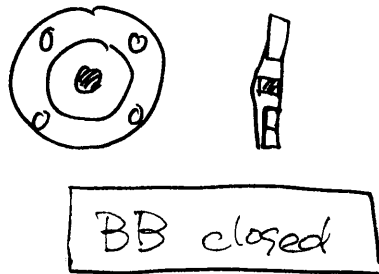
9:58 RUN 6600 same as #6598

11:02 Refrigerator Status

- Cold head 170.0 K, 0.114 MPa
- heater power 49.3%

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2kBq Am/Be source is placed in front of the LP window



run comment in the file is wrong.

14:56 Run #6601 pedestal @ 1e6, w/o beam w/o circ w/ 2kBq Am/Be.

14:59 Run #6602 LED.

15:07 Run #6603  $\alpha$ . w/ Am/Be source

15:24 Run #6604 Lke FBKFS Self trigger  
trig. rates: requested 2099 Hz  
accepted 111 Hz

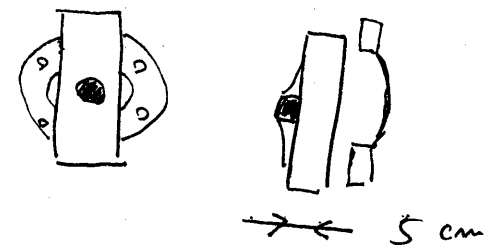
CFD threshold

-0.01 V  $\rightarrow$  -0.03 V.

16:59 Run #6605 same as #6604, with higher threshold.  
trig. rates requested: 67 Hz  
accepted: 41 Hz

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put paraffine between Am/Be and window.

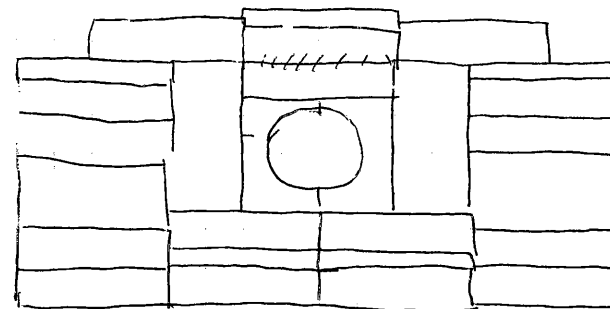


17:26 Run #6606 same as 6605, with paraffine.  
trig. rates req. 52 Hz  
accept. 34 Hz

Am/Be source removed.

17:56 Run #6607.  $\alpha$ . w/o Am/Be source.  
trig. rates: requested 41 Hz  
accepted 30 Hz  
 $\rightarrow$  Back Ground Run.

18:30 ~ Replaced NaI collimeter from  $\phi 4$  to  $\phi 11.5$  cm



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18:50 BB open

19:24 pedestal Run #6608

pedestal FSH52 = 75

19:26 Run #6609

LED

19:32 Run #6610

$\alpha$

19:37 Run #6611

TiP S1 \* NaI4 \* LXe F8BK4

with  $\phi$  11.5 cm collimeter @ NaI

9.5 @ LXe

FSH52 = 75

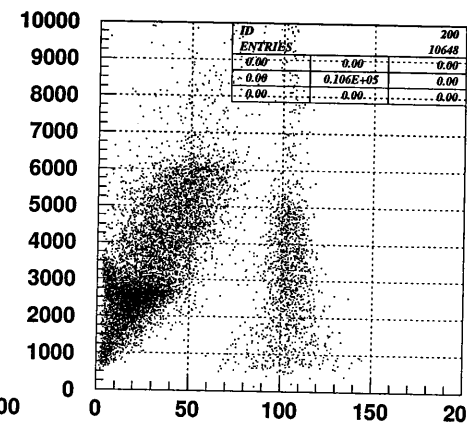
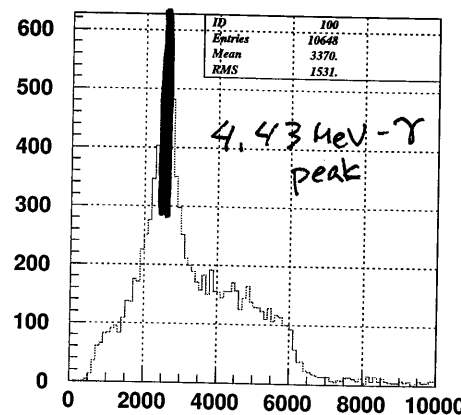
CFD thre = -0.015 V

trigger rates: registered 2.8 Hz

accepted 2.8 Hz

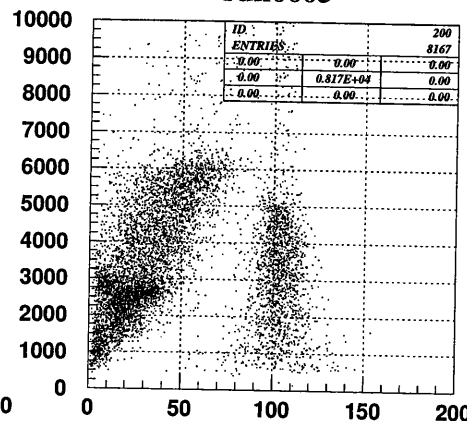
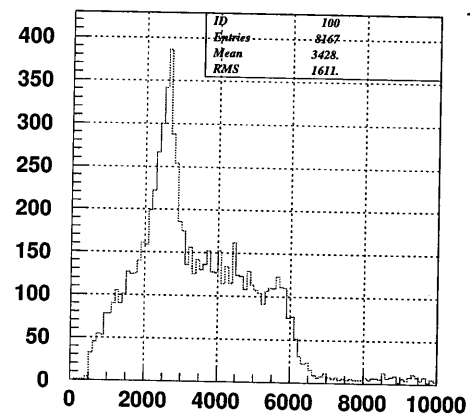
$\frac{27291 - 13740}{13740} \sim 1.0 \text{ Hz}$

Am/Be run $\beta$



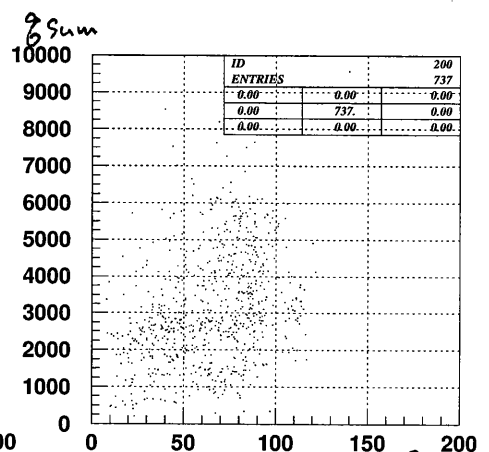
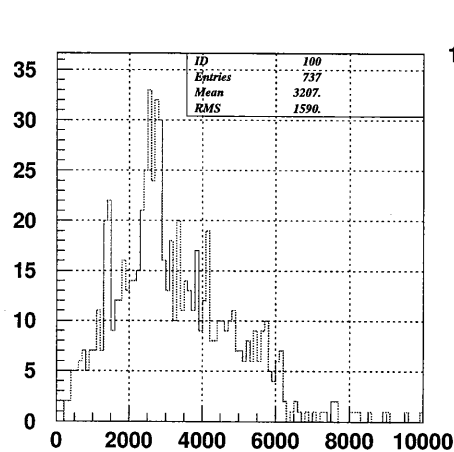
run6605 Qsum

run6605



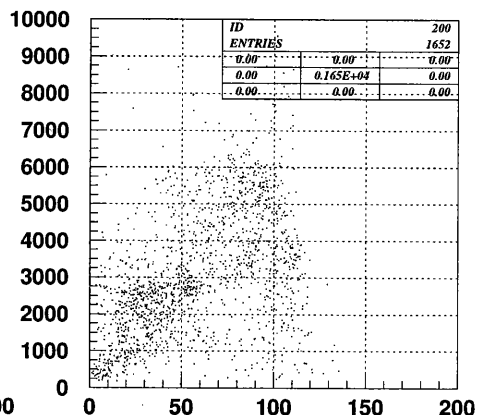
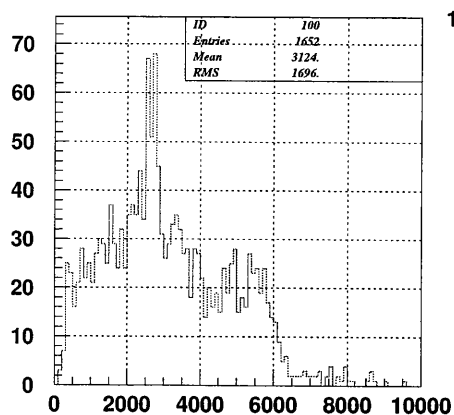
run6606 Qsum

run6606



run6603 Qsum

run6603



run6604 Qsum

run6604

cuts:  $700 < Qsum < 10000$

$\alpha$

$|x\_average| < 7$

$\alpha$

$|y\_average| < 7$

$\alpha$ -run

LXe F8BK4 self trigger.

CFD thre = -0.01 V

to elim.  $\alpha$ 's

LXe F8BK4 self.

CFD thre = -0.015 V

-0.030

LXe F8BK4 self.

CFD thre = -0.015 V

w/ paraffine -0.030

LXe F8BK4 self

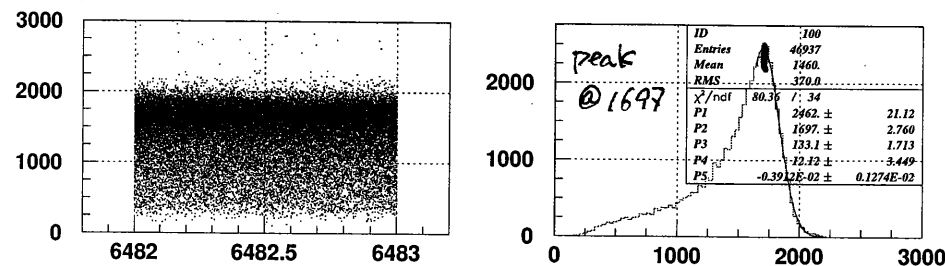
CFD thre = -0.015 V

-0.030

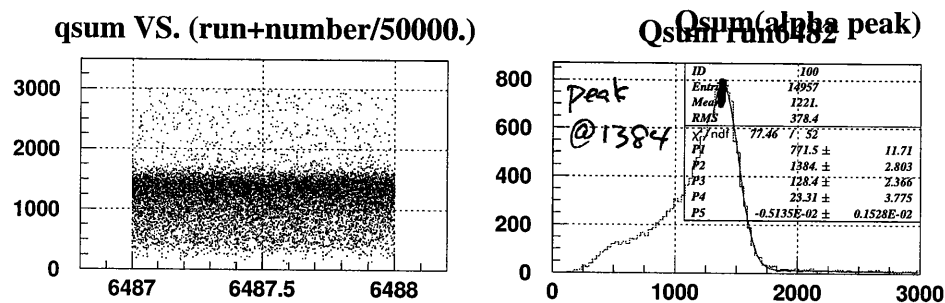
w/o Am/Be source

(Background Run)

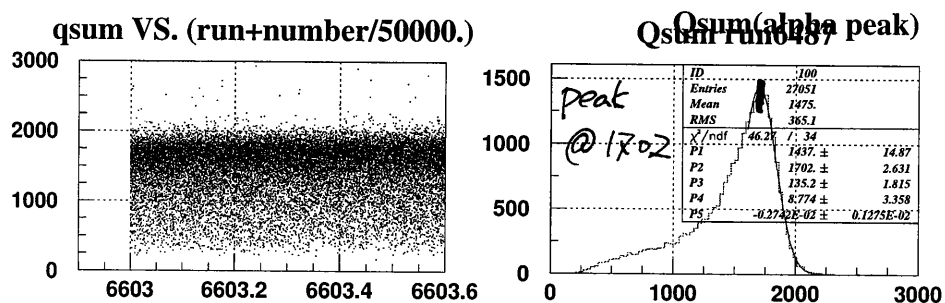
27/Nov/2003  $\alpha$ -peak position with & without Am/Be source



Run 6482  
 $\alpha$ -run BB closed  
 w/o Am/Be



Run 6487  
 $\alpha$ -run BB opened  
 w/o Am/Be



Run 6603  
 $\alpha$ -run BB closed  
 with Am/Be

cut. for selecting  $\alpha$ -events:  
~~cuts~~  $(|x\text{-average}| < 2 \ \&\& \ 9 < |y\text{-average}| < 13)$   
 or  
 $(|y\text{-average}| < 2 \ \&\& \ 9 < |x\text{-average}| < 13)$

No significant difference between with and without Am/Be source

23:50 FSH 52 75  $\rightarrow$  125

#6612 S1 \* NaI4 \* Xe F8BK4  $\Rightarrow$  stopped immediately because Beam is down (No BEAM for 2 hrs)

23:53 #6613 pedestal BB closed  
 23:54 #6614 LED //

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0:02 #6615  $\alpha$   $\rightarrow$  Junk.

SCFE died  $\rightarrow$  restarted

0:29 ~~#6615~~ stop #6615.

0:30 #6616  $\alpha$   $\rightarrow$  Junk.

Frontend tripped  $\rightarrow$  restart.

0:32 #6617  $\alpha$   $\sim$  50000 events.

No Beam Before 4:00

- Monitoring histogram for ADC1 is Ready. In order to reduce number of binned histogram in the on-line analyzer, one two-dimensional histogram is prepared for this purpose. ID=1600. X from 0 to 4096 with 1024 bins for ADC data and Y from 0 to 267 for ADC channel. A kumac adct.kumac can be used to slice the 2-d histo and plot them.

Pedestal of CIA is adjusted by changing the trimmer potentiometer, since most of channel have rather large pedestals for the amplified signal. Now for almost all channel.

Pedestal for normal signal 50 ~ 150 ch  
 amplified signal  $\sim$  500 ch  
 ( $\times 8$ ).

in 12 bit resolution each.

#6618, #6619 test RUNS for adjusting pedestal.

3:05 SM

3:18 Beam is coming back  $\Rightarrow$  open BB

5:09 Beam seems to be stabilized...

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6620 # 6620 Pedestal Beam ON FSH52: 125  
 5:12 # 6621 LED "  
 5:19 #6622  $\alpha$  "  $\leftarrow$  Might be LED...  
 ... Beam has gone in RUN 6622

No beam for 20 minutes, No announcement.

Take Cosmic Ray Data

5:40 # 6623 Pedestal No Beam  
 5:42 # 6624 LED "  
 ... Beam is back in this RUN

5:50 7500  $\mu$ A ... looks to be stable.  
 wait for the current to be over 7800  $\mu$ A

6:20 Beam current is above 7800V.  
 Stable for 20 minutes, take calibration data before starting  $\pi^0$  RUN

6:42 #6625 Pedestal Beam ON, FSH52: 125 (1840  $\mu$ A)

6:44 #6626 LED "

6:54 #6627  $\alpha$  "

7:04 #6628 CFD thr = -0.03 V

S1 \* NaI4 \* Xe (BK4)  
 FSH52: 128, Proton Current 1840  $\mu$ A  
 TRIGGER RATE  $\sim$  2.2 Hz  
 125?  
 yes!

10:00 Warning message appears on the MIDAS console: SC Frontend is not running. Run # 6628 stopped

10:10 CFD thr reset to -10 mV. Beam blocker closed.

12:40 <sup>FRONTEND</sup> DAQ temporarily modified to flash LED during  $\alpha$  runs at a fixed setting. The idea is to reproduce a low-intensity, high-rate light source (as in the case of beam on) inside the detector and to check the behaviour of PMTs as a function of light intensity and pulsing rate.

13:30 Run # 6630 pedestal BEAM OFF

13:35 Run # 6631 LED

13:43 Run # 6632  $\alpha$  (with LED 1+5 pulsing at 100 Hz and DAC=89)  $\sim$  90,000 evt (15 min)

14:10 Run # 6633  $\alpha$  (" " " " at 1000 Hz " " )

14:30 Run # 6634  $\alpha$  (" " " " at 10 kHz " " )

14:50 Run # 6635  $\alpha$  (" " " " at 100 kHz " " )

15:10 Run # 6636  $\alpha$  (" " " " at 100 kHz " DAC=90)

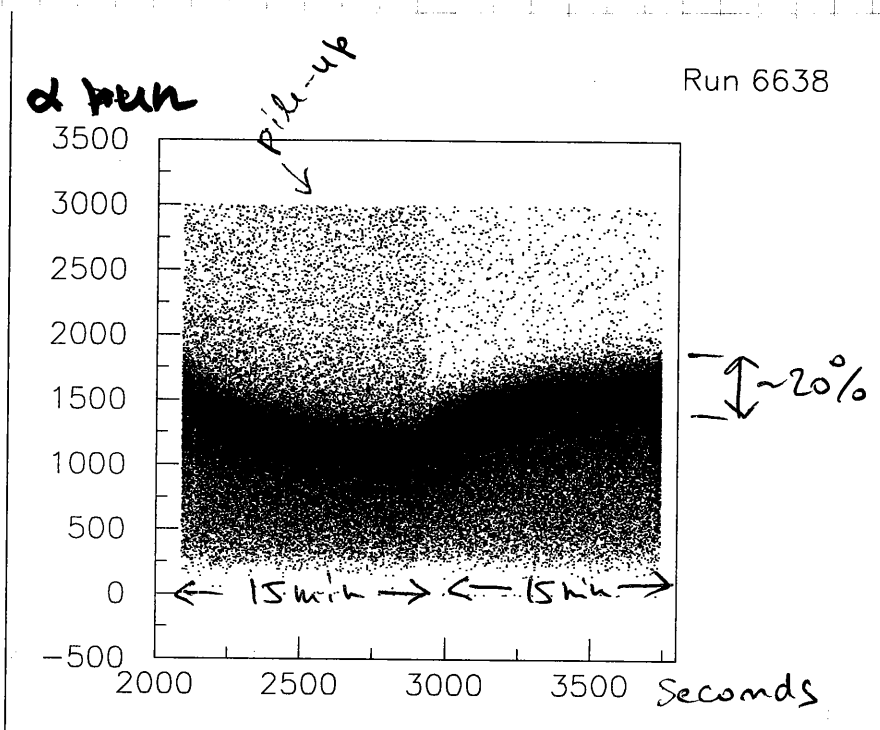
15:35 Run # 6637  $\alpha$  (" " " " at 100 kHz " DAC=91)

16:10 Run # 6638  $\alpha$  (" " " " at 50 kHz " DAC=92)

$\hookrightarrow$  at event #  $\sim$  90,000 the LED-DRIVER was artificially (taken away the common input) stopped.  
 we went on data taking for other 90,000 events (15 min).



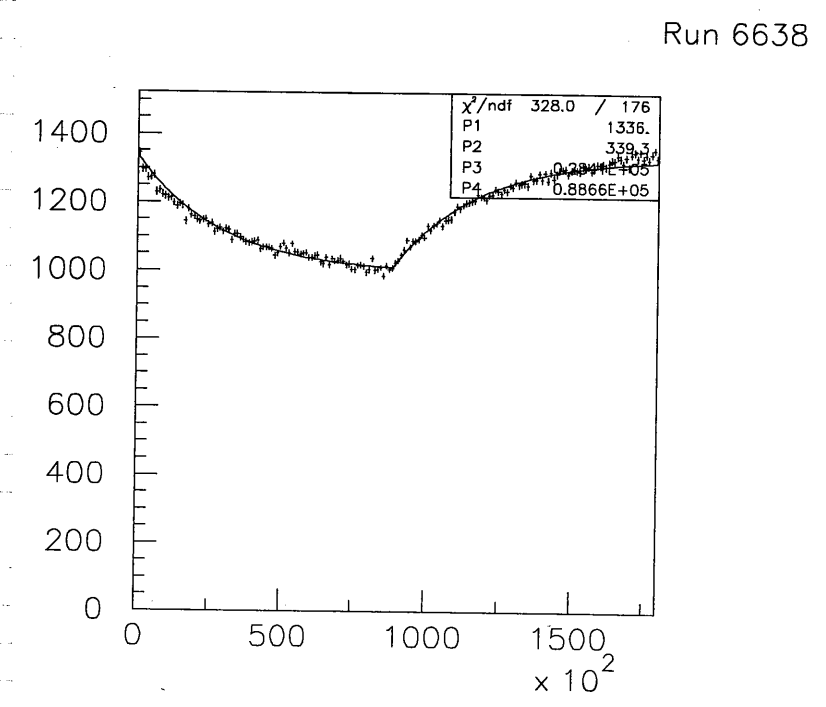
17:45 Analysis of run 6638 ( $\alpha + \text{LED}$  (DAC=92, rate=50kHz))



This photoelectron rate is not too different from the one due to  $\alpha$ 's. But the latter is always present and one cannot see any on-off transitions.

AB + DN

#



- The LED intensity (DAC = 92) corresponds to  $\approx 6000$  photoelectrons ( $\approx 6-7$  MeV).
- The LED rate (50kHz) roughly corresponds to the neutron rate observed at beam on (see nov. 11, run 6164-6167 and the corresponding picture).

- The fit to this  $\uparrow$  plot with  $A + Be^{-t/\tau}$  gives  $\tau \sim 6$  min

- It seems therefore that the fluctuations we observe are due to  $\gamma$ 's from thermal neutron captures around the detector (in its wall), that are observed in beam-on runs.
- Note that the time scale of the picture above corresponds to the one observed at beam-start or beam-shut down.

22/Nov/2003

~18:00 BB opened (FSH52 = 125).

18:38 Run #6639 pedestal

18:40 Run #6640 LED

18:46 Run #6641  $\alpha$

18:59 Run #6642  $\pi^0$  Si \* NaI4 \* LXe F8BK4.

trigger rates:  $\frac{874}{3 \text{ min}} = \frac{874 - 180}{180 \text{ s}} \sim 3.9 \text{ Hz}$

proton 1835  $\mu\text{A}$ .

21:55 Run #6643  $\pi^0$  same as #6642.

22:30 SCFE is dead  $\rightarrow$  restarted.

22:40 end Run #6643

22:40 Run #6644  $\pi^0$  same as #6642.

23/Nov/2003.

3:25 Run #6645 pedestal

3:27 Run #6646 LED

3:35 Run #6647 alpha,

3:43 Run #6648  $\pi^0$  same as #6642

trigger rate:  $\frac{41767 - 8651}{8651} = 3.8 \text{ Hz}$

6:40 Run #6649  $\pi^0$  same as #6642.

23/Nov/2003

8:00 AB: Refrig. temp = 170 K: Heating power = 41.64%  
We want to see it, with good calib., it is possible to have good resolutions also at high intensity of the beam.

8:05 RUN #6649 stopped

BB closed

calibrations @ BB closed

8:30 Pedestal : Run #6650

8:35 LED : Run #6651

8:45  $\alpha$  : Run #6652

8:50 BB opened : (FSH52 = 350)

calibrations @ BB open

9:15 Run #6653 : pedestal

9:20 Run #6654 : LED

9:28 Run #6655 :  $\alpha$

9:35 Run #6656 :  $\pi^0$  Si \* NaI4 \* LXe F8BK4

proton 1906  $\mu\text{A}$

Ev. rate  $\sim 9 \text{ Hz}$

Beam instabilities observed at the beginn.

10:50 Run #6656 stopped automatically at 50,000 events.

Found SC frontend crash alarm ON.

11:00 Run #6657 started  $\pi^0$ , same conditions as before

proton 1915  $\mu\text{A}$   
event rate  $\sim 10 \text{ Hz}$   
beam stable up to now

12:15 Run # 6657 completed 50000 events  
 12:20 Reset the ~~CFD~~ CFD threshold for Xesum to -140 mV. (it was -25 mV)  
 12:25 Start Run #6658. Same trigger as before (apart from higher threshold)  
 proton current stable at ~1900  $\mu$ A  
 event rate ~ 5 hz

12:55 Run #6658 stopped to check the formation of the signal to the CFD. The linear fan-in out has an offset of ~ 10 mV. We put a cable with a capacitor before the input to the CFD.

13:10 Run #6659 same as 6658:  $\pi^0$   $\&I$  \* NaI4 \* 8F4BK  
 Thr. = -140 mV  
 p. cur. = 1928  
 rate ~ 4 Hz (w/o pedestals)

15:54 FSH 52 350  $\rightarrow$  125

16:25 ~~# pedestal~~  
 # 6660 pedestal  
 # 6661 LED  
 16:32 # 6662 alpha

CFD thr changed back to -30 mV to see the deeper events.

~ 17:00 We found SC PC (NEC versapro) stopped  $\rightarrow$  reboot & restart meg-lpt. Vi  $\downarrow$  maybe since 16:45

17:24 Calorimeter looks almost stable  $\text{\textcircled{A}}$   
 cold head 169.9 K  
 Heating power 38.8%

17:25 # 6663  $\pi^0$  run  $\&I$  \* NaI4 \* Xe F8 BK4  
 • FSH52 = 125  
 • CFD th -30 mV  
 • proton 1900  $\mu$ A  
 17:30 Beam is down  $\Rightarrow$  Back in 10 min. 3451  $\pi^0$  events

$\rightarrow$  First 1500 events should be discarded in # 6663

20:01 # 6664  $\pi^0$  run same as # 6663 because of beam trouble  
 Last 1000 events should be discarded also

# 23:38 # 6665  $\pi^0$  run same as before

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2:30 beam is down. Run # 6665 paused.  
 (2:25 - 1/4 STD UNTERBRUCH  $\rightarrow$  SETUP) message appeared.  
 $\rightarrow$  Run # 6665 stopped.

2:45 beam is getting back.  
 we'll wait for stable beam.....

3:45 beam is getting stable.

4:20 SCFE stopped abnormally.  $\rightarrow$  restart.  $\rightarrow$  O.K.

4:20 Beam is stable now <sup>for 30 min.</sup> so we'll take calibration data.

Run # 6666 pedestal.

4:25 Run # 6667 LED

4:30 Run # 6668 alpha

4:45 Run # 6669  $\pi^0$  run  $\&I$  \* NaI4 \* Xe F8 BK4  
 same as # 6663

6:40 SCFE is dead  $\rightarrow$  restart proton: 1860  $\mu$ A  
 6:49 stop Run # 6669

6:50 RUN # 6670  $\pi^0$  run same as # 6669.

AB 7:10 Run 6670 stopped : no event was being taken : a problem with the acquisition

7:10 Run 6671 started  $\pi^0$  run same as #6669  
now it seems ok.  
rate (ped. subtracted)  $\sim 2$  Hz  
— — P.corr = 1870  $\mu$ A

7:20 Refrig. temp = 170.0 K Heat. power 41.01 %

10:25 Run 6671 stopped  $\sim 41000$  events

We would like to end with some source (Am/Be) test  
+ test the LED stability

BB closed

11:05 Run 6672 pedestal

Run 6673 LED

Run 6674 LXe 8F4BK -30 mV thr  
w. Am/Be + Graphite absorber  
in front of the LP thin window

12:30 Run 6675 LXe 8F4BK -30 mV threshold  
Am/Be source stuck to Right side of LXe vessel  
at a distance of 74 cm from the Front flange.  
no degrader

13:00 Run 6675 completed

Am/Be source removed

13:15 Run #6676 pedestal

13:20 Run #6677 LED 1+5 only BAC 92 is used, LED pulsed a 10 Hz  
to check LED stability over  $\sim 1$ h data taking

~~15:30 Run #6678 LXe 8 clusters~~

17:10 Run #6678 LXe 8F4BK, just background of  
thermal n capture.

17:35 LH2 Target cell is empty Empty run

# 6679 pedestal @ 1e6 BB closed

# 6680 LED @ 1e6 "

# 6681 alpha BB closed

↑↑  
Gas hydrogen  
@ 2 bar & 86 K  
still remain  
inside the cell

18:07 BB open FSH52 = 350

18:07 # 6682 alpha trig rate  $\sim 18$  KHz

18:15 # 6683 <sup>alpha</sup> same as before " 17.2 KHz

18:23 # 6684 alpha same as before " 17.0 KHz

18:31 # 6685 alpha same as before " 16.6 KHz.  
→ alpha peak almost stable

~~18:35~~

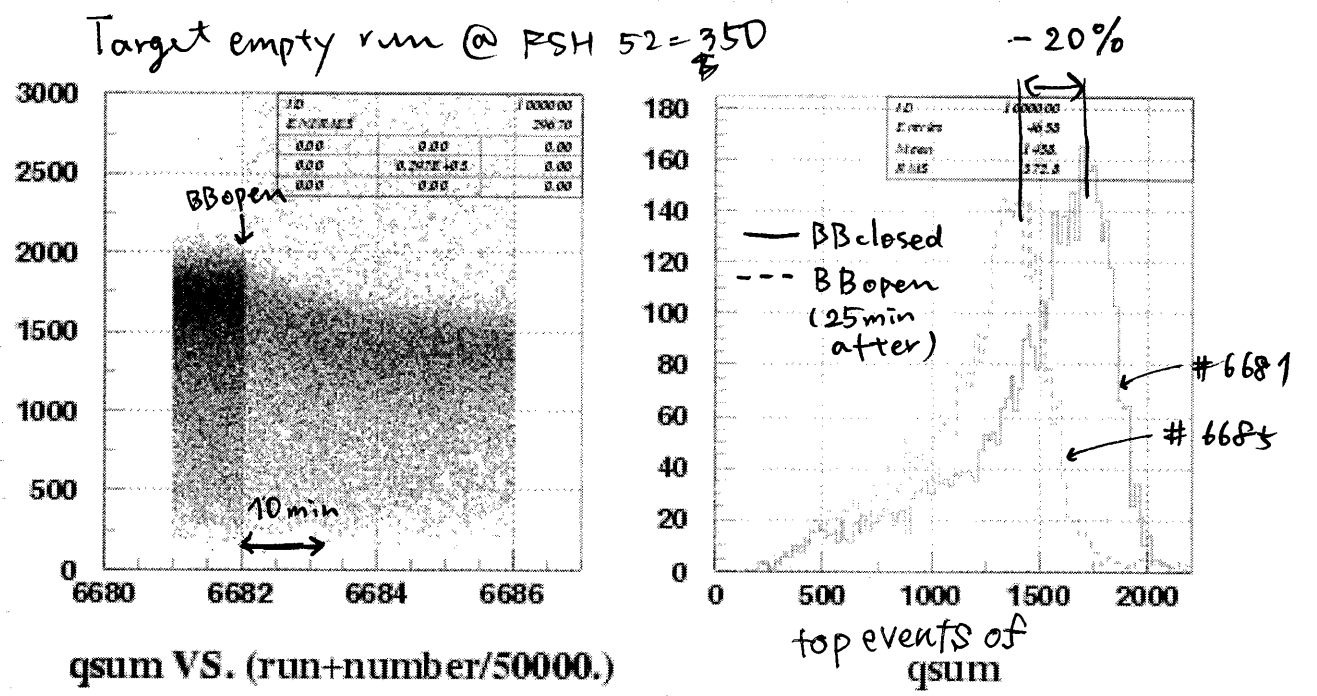
18:45 Refrigerator status Heating power 38.09%

18:47 # 6686 pedestal BB open

# 6687 LED "

19:32 # 6688 alpha "

~~FSH52 = 350~~



# 21:54 #6698 Xe 8 cluster self trigger • BB closed (FSH52 = 350)

trigger rate 7 kHz  
⇒ almost alpha.

• NIM thr - 40mV  
• Empty target.  
• Just to see BG. not related to beam

22:08 NIM thr -40mV ⇒ -75mV (Require at least 2 hits in one cluster.)

~ 22:30 Network trouble • unable to control the beam line magnet  
• It's not our problem.

23:00 Beam is down

still network trouble.  
for the moment, we will take calibration data.

# 19:40 SCFE crashed ⇒ restart  
19:42 #6689 S1 \* NaI4 \* Xe F8 BK4 • CFD thr - 30mV  
• BB open (FSH52 = 350)  
• Empty target (only Gas)

⇒ go for dinner

20:46 #6689 stopped

20:50 #6690 Xe 8 cluster self trigger • BB open (FSH52 = 350)  
• NIM thr - 40mV  
• Empty target

• trig rate (request) 45.6 kHz  
Require at least 1 hit in one cluster

21:01 #6691 pedestal BB open  
#6692 LED "  
#6693 alpha "  
← NIM thr - 75mV

21:19 BB closed

21:19 #6694 alpha just after closing BB

21:28 #6695 alpha same as #6694

21:36 #6696 alpha same as before

21:43 #6697 alpha //

25/Nov. 2003. #6699 ~ #6705 test run.

0:35. #6706 pedestal  
#6707 LED.  
0:50 #6708 LED  
#6709 ~ 6711 test run. } These data was not good because of some network communication problems.  
1:10 #6712 alpha.  
1:30 #6713 alpha.  
1:35 #6714 LED.

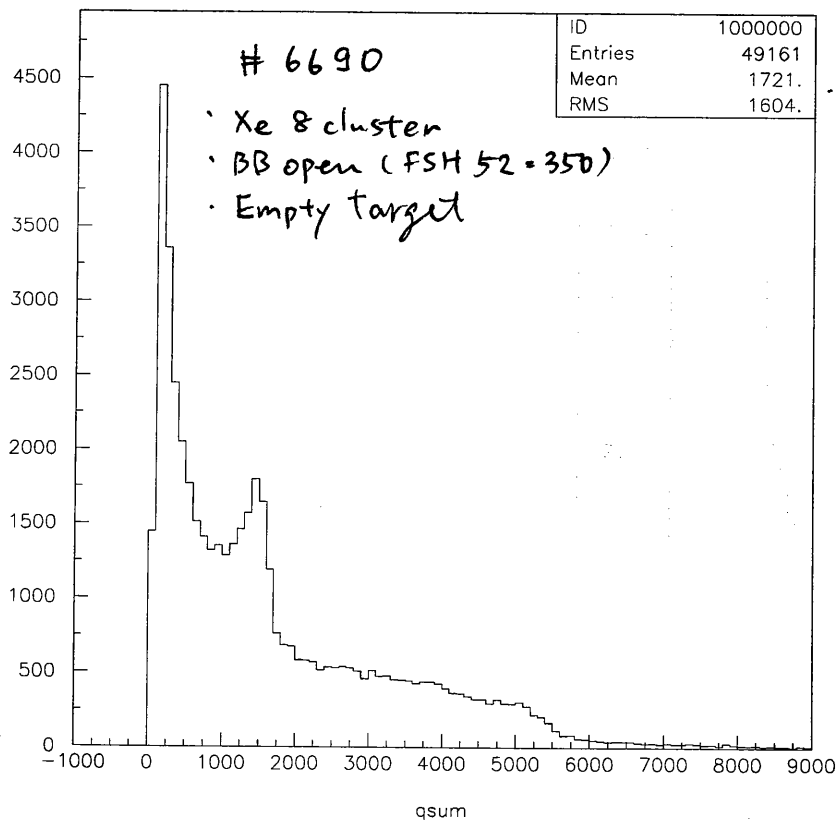
↙ Closed.

Pb wall setting changed.

Aare 0 mm	(Himmel 18 mm)
Berg 0 mm	(Hölle 19 mm)

from Aare 9 mm, Berg 16 mm

6215 } test to PUKS  
6216 }



See also the plot  
 for the ~~the~~ normal  
 target run  
 on 11 Nov, '03

5:15 Run # 6725 Xe 8 cluster selftrigger

trigger rate 22.4 kHz BB opened.  
 NIM thr <sup>-175</sup> → -40 mV (FSH 52 = 350)  
 Empty target. Pb wall closed.  
 proton beam current (~ 690 μA)

5:28 Run # 6726 pedestal

5:29 Run # 6727 LED

5:36 Run # 6728 alpha (threshold was -40 mV, stopped.)

5:45 Run # 6729 alpha (thresh. -40 mV → -75 mV).

5:50

Pb wall setting recovered.

Aare. 9mm Himmel 18mm.  
 Berg 16mm. Hölle 19mm.

BB closed.

6:05 Run # 6730 pedestal with BB closed, Pb wall opened.

6:10 Run # 6731 LED proton current ~ 690 μA

6:16 Run # 6732 alpha

6:24 Run # 6733 alpha

6:32 BB open

6:33 Run # 6734 alpha with BB opened, Pb wall opened  
 proton current ~ 690 μA

6:41 Run # 6735 alpha

→ Stopped by disk full of c: drive.

6:52 Run # 6736 alpha

7:00 Run # 6737 alpha

SI trigger  
 $9.49 \times 10^6 / 10 \text{ sec}$   
 $\approx 950 \text{ kHz}$

run06682.mid ~ run06699.mid  
 were moved to E/030927-0312.PSI.

3:35 Run # 6717 pedestal with BB closed, Pb wall closed

3:40 Run # 6718 LED. circuits off.

3:42 Run # 6719 alpha. FSH 52: 350.

4:25 beam was unstable at 3:50. Now reduced beam (~ 690 μA) is available.  
 we will compare BB open/close effect at this condition.

This corresponds to π<sup>-</sup>  
 intensity with 1870 μA  
 & FSH 52 = 150

Run # 6720 alpha with BB closed.

4:36 BB open.

4:36 Run # 6721 alpha with BB opened.

4:43 Run # 6722 alpha with BB opened.

4:51 Run # 6723 alpha "

4:58 Run # 6724 alpha "

SI trigger rate  
 $4.8 \times 10^5 / 10 \text{ sec}$   
 48 kHz  
 from scaler [7]

25 Nov 2003

7:19 Run #6738 Xe 8 cluster self trigger

BB opened FSH52=350 Pbwall opened

NIM thr -40mV

Empty target

proton beam current  $\sim 690 \mu A$

7:32 Run #6739 pedestal with BB opened, Pbwall opened

proton current  $\sim 690 \mu A$

7:33 Run #6740 LED

7:47 Run #6741 alpha (NIM thr -40mV  $\rightarrow$  -75mV)

7:54 Run #6742 alpha (NIM thr -75mV)

NIM threshold (Number of hit in a cluster) changed to -40mV

8:00  $\sim$  Beam unstable

8:40 looks to be stable around 520  $\mu A$

8:46 Run #6743 alpha proton 520  $\mu A$  (No scaler data for 31)

Same condition as 6742 (NIM thr -40mV)

8:53 Run #6744 d same as Run #6742 (NIM threshold -40mV)  
S1 RATE  $7.63 \times 10^6$  / 10sec = 760k Hz (scaler CH [7] for S1)

SR investigate the network ... Beam Blocks closed

9:05 BB opened beam current seems to be increasing. now 550  $\mu A$ .

Because proton current is lower than usual operation current,

FSH52 setting of 350 corresponds to

$$\frac{550 \mu A}{1870 \mu A} \times 1700 = 500 \Rightarrow FSH52 \sim 400-120$$

↑  
S1 / 10<sup>6</sup>p for FSH52=350 with 1870  $\mu A$  proton

from the plots  
on 15/Nov 03

Network Problem is fixed by exports. It was found a module located upstream of our network was out of order. Due to this all network connection in the experimental hall was dead.

- Slow central PC was rebooted.
- HV01, HV02 were rebooted, too.
- SCPE started - LAZF-ARCHIVE too.

In case of network problem (midnight), send "troubleshooting" or ask "pikett service". They can be reached from

<http://www.psa.ch>

$\rightarrow$  Services  $\rightarrow$  Computing  $\rightarrow$  User Support

... but better to keep wireless LAN backup option.

10:10 Beam is stable at 600  $\mu A$  for these 20 minutes.

10:19 Beam STOPPED. 1/2 STD INTERRUPT

from 9:16. DAD was running with  $\pi^0$  trigger

#6746  $\pi^0$  trigger empty target almost meaningless data.

10:24 #6746 end.

Threshold level for number of hit PMTs in a cluster ("NIM thr") was changed from -40mV to -75mV  
(1 hit) (2 hits)

10:53 #6747 COSMIC w/o BEAM

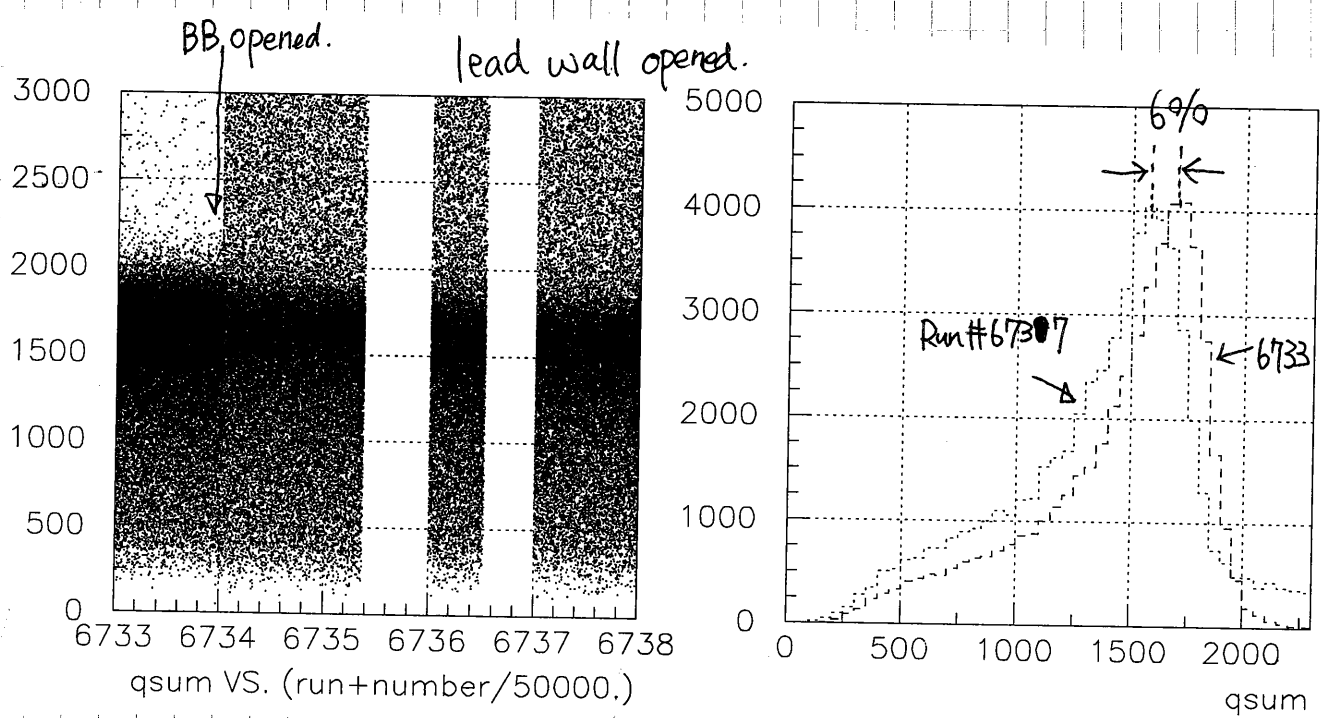
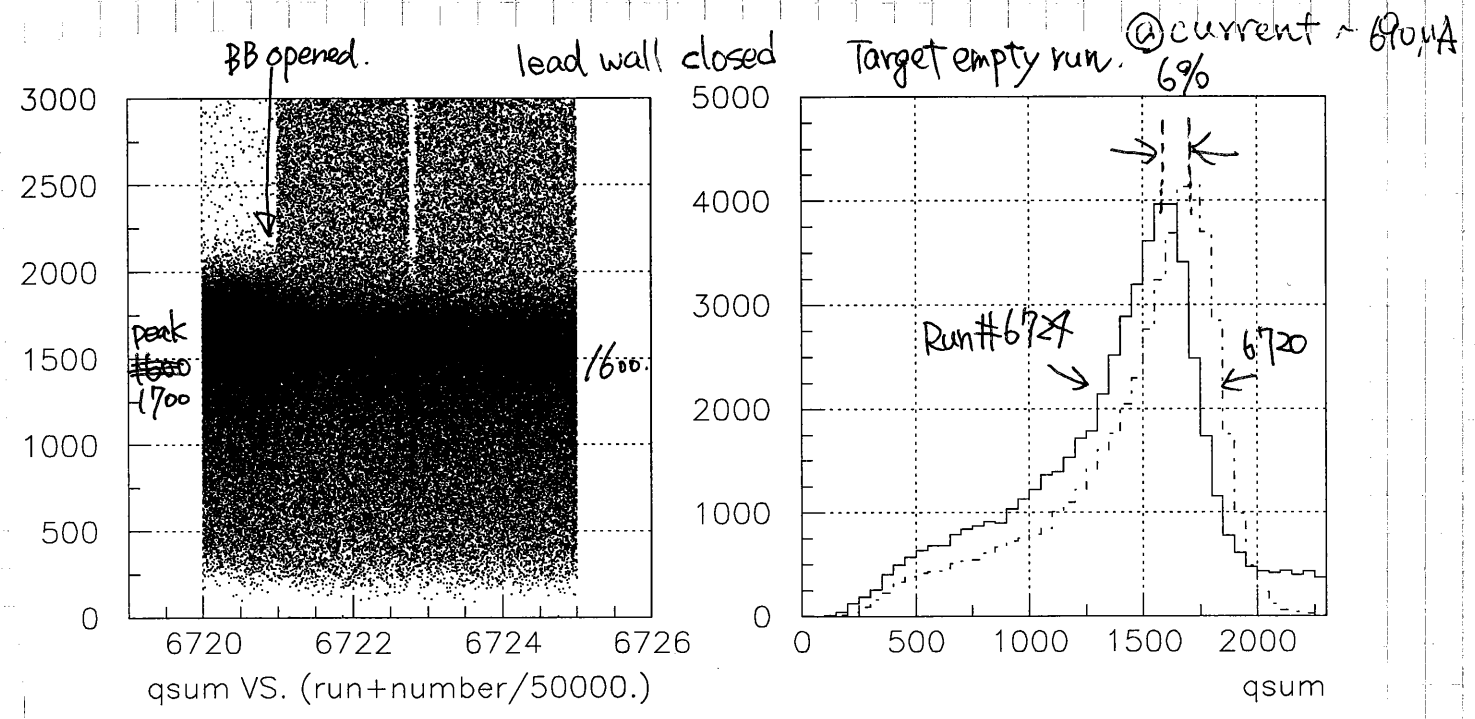


25 Nov 03

11:00 Beam current is increasing 800  $\mu$ A ~ 900  $\mu$ A  
11:42 1500  $\mu$ A

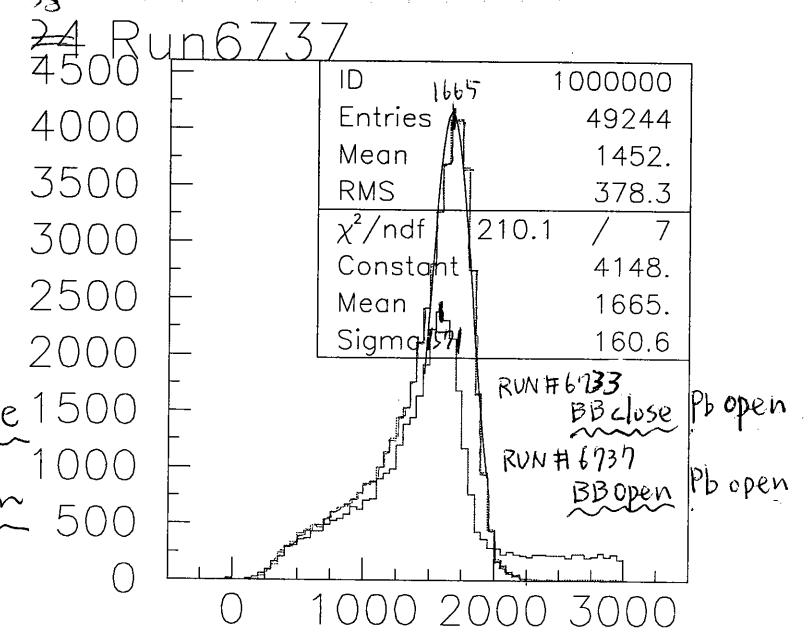
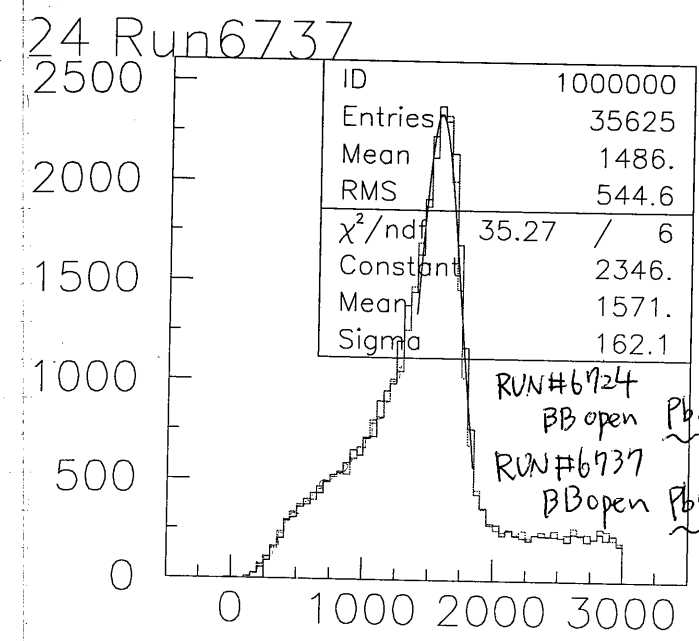
PC for beam magnet control was rebooted to configure the network settings again (after network problem)

12:01 Beam current 1720  $\mu$ A  
12:10 1840  $\mu$ A



25 Nov 03

12:21 FSH52 350  $\rightarrow$  200



FSH52 setting 200

#6748 Pedestal  $\rightarrow$  failure.

DAQ trouble. CIA in slot 11 could not be recognized but this problem was fixed by inserting in/out the module

12:59 #6749 Pedestal beam on

Something is wrong still.  $\leftarrow$  fixed by rebooting analyzer.

13:23 #6750 Pedestal

proton	1.856 $\mu$ A
FSH52	: 200
S1	<del>120 kHz</del> 120 kHz

#6751 LED . . . failure. Reboot all processes including "mhitpd"

13:30 #6752 LED OK.

proton	1.851 $\mu$ A
FSH52	200
S1	429 kHz

offline processed w/ #6750 pedestal #6731 LED

13:35 #6753 TRIGGER RATE 13.0 kHz

proton	1.849 $\mu$ A
FSH52	200
S1	12.9 kHz



25 (Nov) 03  
 13:59 "NIM threshold" -75mV → -45mV  
 6754 Xe & cluster trigger  
 trigger rate 33.2 kHz  
 proton 1.85 mA  
 S1 154 kHz

*request 1 lin in a cluster*  
*processed w/ 6750 ped 6731 LED*

FSH52 setting 75 (14:08)

14:26 #6755 Pedestal proton 1.829 mA  
 14:32 #6756 LED proton 1.829 mA  
 S1 rate 40 kHz  
 14:38 #6757 Xe & cluster trigger  
*processed w/ 6755 ped 6731 LED*

trigger rate 13.5 kHz  
 proton 1.830 mA  
 S1 40.0 kHz

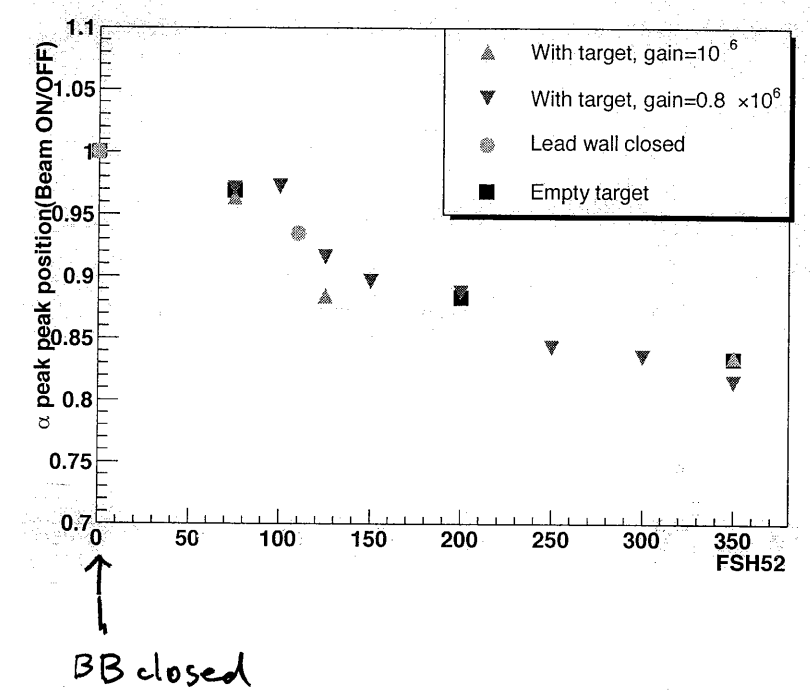
*processed same as #6757*

14:47 #6758 α ("NIM thr" = -45mV)  
 TRIGGER rate 10.3 kHz  
 proton 1.822 mA  
 S1 40.0 kHz

"NIM threshold" -45mV → -75mV  
 14:56 #6759 α ("NIM threshold" = -75mV)  
 TRIGGER rate 6.9 kHz  
 proton 1.831 mA  
 S1 37.0 kHz

15:01 FSH52 75 → 350 BB still open

Summary of the saturation effect study.  
 Ratio of α peak position between BB open and closed



Data with lead wall closed was taken  
 @ I<sub>proton</sub> = 550 μA & FSH52 = 350.

This condition is considered to be equivalent to  
 I<sub>proton</sub> = 1870 μA & FSH52 = 100-120

⇒ We take 110 for FSH52 value for that data.

↳ Satoshi's estimation 5 pages before.

To shift crew.

- NEC laptop to run LabView sometimes halts. In that case you have to reboot the laptop to restart Labview program.
- You could easily realize the problem because the LED on the front face of each MSCB module is not blinking if the software is not running.
- Please check it sometimes during your shift time.
- ~~this problem would not cause serious thing~~

*maybe due to overload on CPU*

~ 17:00 Target chamber ~~removed~~ taken away from the beam line

25/11/2003

New Scan Series Preparation for (51)  
Degraded inside L<sub>H2</sub> target

① Try and reconfirm previous measurements

file Megill pi zphi deg. set

IARSET EMPTY

magnets checked

S1 threshold 650 mV

HV = -1900V

FSS2 again @ 350

initial rate

$S_{1\pi} = 16.48 \text{ M}/10^6 \text{ p}$   
 $S_{1.RF} = 14.66 \text{ M}/10^6 \text{ p}$   
 $S_{1.RF.\delta} = 503/10^6 \text{ p}$   
time = 5.577 sec.

Check signals

S1 threshold seems a bit too high 650 → 620 mV

S1.RF timing OK

620 mV  
time

$S_{1\pi} = 16.97 \text{ M}/10^6 \text{ p}$   
 $S_{1\pi.RF} = 14.51 \text{ M}/10^6 \text{ p}$   
 $S_{1.RF.\delta} = 482$   
time 5.584 sec 1824 pA

~ 20% lower

Now ZBN closed here  
maybe S1 position slightly different

Original ZBN

Acme: 18 mm

Berg: 22 mm

Himmel: 18 mm

Holle: 19 mm

NEW ZBN

9 mm

16 mm

18 mm

19 mm

} Same.

Now Scanner + Pill installed ~ beam centre 244 mm DS of Collector ZBN

HV pill = -570

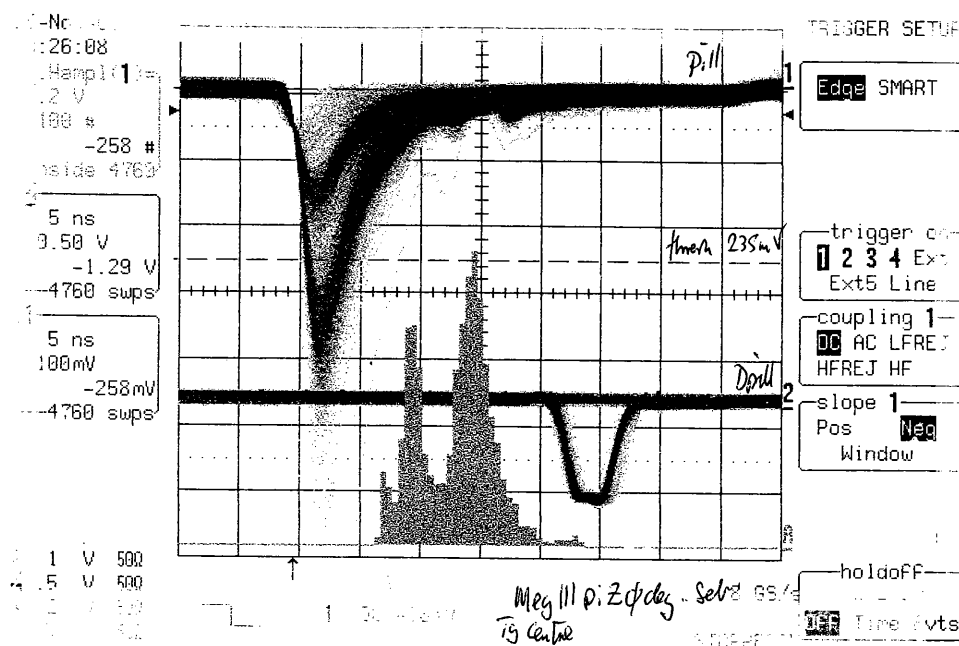
Dpill threshold = -235 mV

No Degraded but S1 in place.

Scanner: V: 186.7 mm  
H: 151.7 mm

Pill 244 mm DS ZBN ~ Centre of Tg position

(52)



NO Degraded but S1 in place

Rough Vertical Scan with Horizontal position 151.7 mm ~ 1824 pA

Vertical Position	Pill/10 <sup>6</sup> p
185.0	68.43 k
180.0	63.37 k
175.0	44.53 k
170.0	24.74 k
165.0	11.86 k
160.0	4.64 k
155.0	1.74 k
150.0	0.62 k
145.0	0.32 k
190.0	55.45 k
195.0	34.36 k
200.0	16.58 k
205.0	6.93 k
210.0	2.45 k
215.0	0.82 k
220.0	0.41 k

$\bar{x} = 183.8$   
 $\sigma = 9.761 \text{ mm}$   
 $\Sigma = 337.55 \text{ k}/10^6 \text{ p}$

16 pts

Horizontal Scan for V: 183.8

(53)

Horizontal Position:  $\mu\text{m} \cdot \text{RF} / 10^6 \text{p}$

150.0	63.67k
155.0	72.94k
160.0	65.05k
165.0	41.22k
170.0	15.56k
175.0	4.03k
180.0	0.87k
185.0	0.31k
145.0	45.57k
140.0	24.66k
135.0	10.03k
130.0	2.57k
125.0	0.65k
120.0	0.31k

$\bar{x} = 154.7 \text{ mm}$   
 $\sigma = 9.902 \text{ mm}$   
 $\Sigma = 347.44 \text{ k} / 10^6 \text{p}$

Rate @ optimum:  
 $S_{\pi} = 81.48 \text{ k} / 10^6 \text{p}$   
 $S_{\pi} \cdot \text{RF} = 72.97 \text{ k} / 10^6 \text{p}$   
 in 5.558 sec. 183.8

14p  
 for 5.10

Rate check:

Gaussian:  $R_{\pi} = \frac{2\sigma \times \sigma \times R_{\pi}}{\sqrt{\pi} \cdot \sigma^2} = \frac{2 \times 9.761 \times 9.902 \times 72.97 \text{ k} / 10^6 \text{p}}{\sqrt{\pi}} = 1.41 \cdot 10^7 / 10^6 \text{p}$

17% loss  $R_{\pi} = 1.41 \cdot 10^6 \pi \cdot \text{RF} / \text{MAS}$  VERSION B  
 with slits ZBN closed horizontally  
 S1 in place

