3/12 2.00 start to move new 3ℓ Xe to TANK.

inner vessel 7.5×10^{-3} Pa
outer 〃 2.3×10^{-4} Pa

Apr. 2 connection check at feedthrough

1. ok 2. ok 3. ok 4. ok
5. (1~20) ok (21~32) open 6. ok
7. (1~16) ok (17~32) open 8. ok

Signal cables: All ok!

2/Apr/2003.

LPの外側 HV用 ZIF コネクタ アサイン.

それぞれのコネクタの 8-F, 7-G, 8-G, 7-H, 8-H, 8-J が GND

⇨ HV pin connection check, All ok.

# of open pin
① 1-G, 4-E (8-J) common GND
② 1-N, 1-P, 2-N, 2-P, 3-N, 3-P, 4-N, 4-P, 5-M, 5-N, 5-P, 6-M, 6-N, 6-P, 7-M, 7-P, 8-M, 8-N, 8-P
③ 1-A, 1-B, 1-K, 2-A, 2-B, 2-J, 2-K, 3-A, 3-B, 3-K, 4-A, 4-B, 5-A, 5-K, 6-A, 6-K, 7-A, 7-K, 8-A

7/Apr/2003
9:00 inner vessel 6.1×10^{-3} Pa

Transport to AIST

22:30 He leak test (outer, inner chamber, purification line 0.1C.)
23:00 evacuation start

8/Apr/2003

9:30 inner vessel 2.1×10^{-2}
outer vessel 1.2×10^{-2}
P.S. line

8/Apr/2003

PC network setting

DAQ (win2k)	150.29.207.119
HV (1454)	150.29.206.180
HV (1458)	150.29.206.128
Air Station	DHCP
DNS 1	150.29.246.19
2	150.29.254.121
SNM	255.255.254.0
GW	150.29.206.1

- Air leak is found at 逆止弁 → fixed
- start evacuation P.S. line with only R.P

9/Apr/2003

9:45 start TMP for P.S. line

inner vessel 1.3×10^{-2} Pa
outer vessel 2.2×10^{-3} Pa

P.S. line + Molecular Sieves $\sim 4.0 \times 10^{-1}$ Pa

10:30 Molecular sieves close

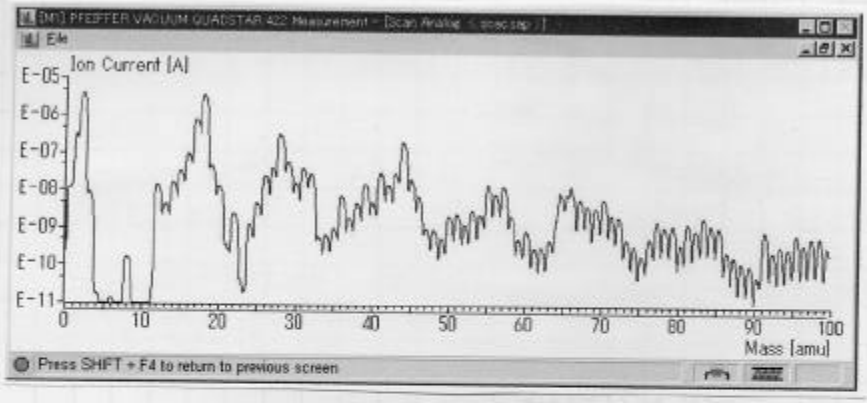
10:45 ~~rga~~ rga 00024 P.S. line 6.6×10^{-4} Pa

10:55 切換 rga 00025 〃 4.0×10^{-4} Pa

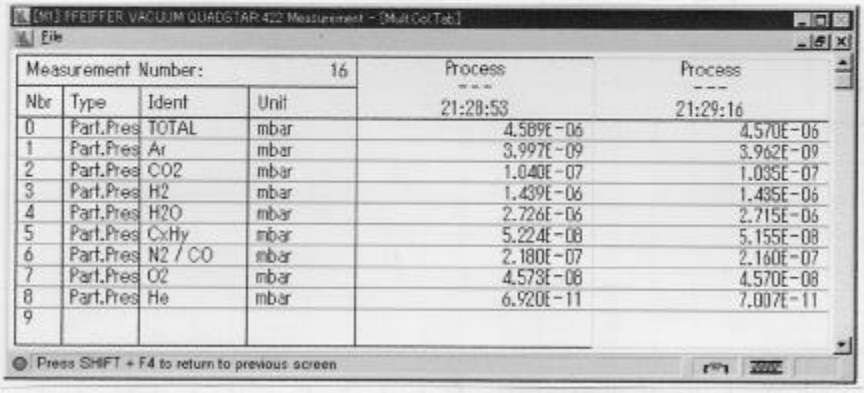
rga00026 P.S. + inner vessel

Piezo Valie close → connect P.S line and inner vessel

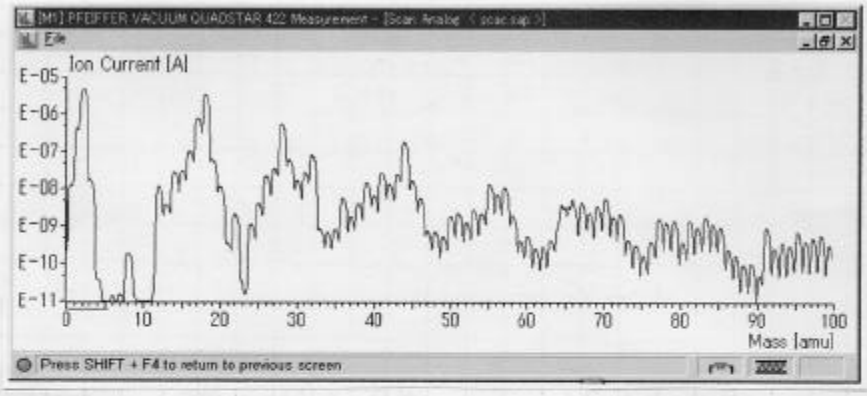
11:30 rga 00027 P.S. + inner vessel 3.0×10^{-4} Pa



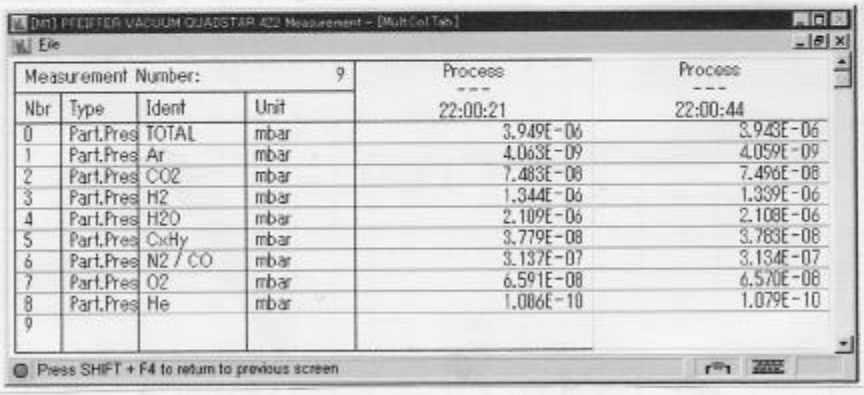
rga0025



Measurement Number:			16	Process --- 21:28:53	Process --- 21:29:16
Nbr	Type	Ident	Unit		
0	Part.Pres	TOTAL	mbar	4.589E-06	4.570E-06
1	Part.Pres	Ar	mbar	3.997E-09	3.962E-09
2	Part.Pres	CO2	mbar	1.040E-07	1.035E-07
3	Part.Pres	H2	mbar	1.439E-06	1.435E-06
4	Part.Pres	H2O	mbar	2.726E-06	2.715E-06
5	Part.Pres	CxHy	mbar	5.224E-08	5.155E-08
6	Part.Pres	N2 / CO	mbar	2.180E-07	2.160E-07
7	Part.Pres	O2	mbar	4.573E-08	4.570E-08
8	Part.Pres	He	mbar	6.920E-11	7.007E-11
9					



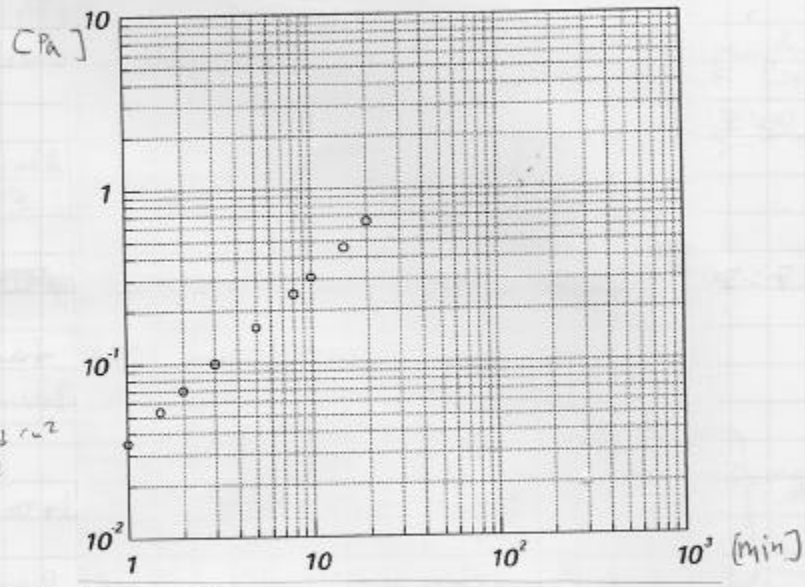
rga0029



Measurement Number:			9	Process --- 22:00:21	Process --- 22:00:44
Nbr	Type	Ident	Unit		
0	Part.Pres	TOTAL	mbar	3.949E-06	3.943E-06
1	Part.Pres	Ar	mbar	4.063E-09	4.059E-09
2	Part.Pres	CO2	mbar	7.483E-08	7.496E-08
3	Part.Pres	H2	mbar	1.344E-06	1.339E-06
4	Part.Pres	H2O	mbar	2.109E-06	2.108E-06
5	Part.Pres	CxHy	mbar	3.779E-08	3.783E-08
6	Part.Pres	N2 / CO	mbar	3.137E-07	3.134E-07
7	Part.Pres	O2	mbar	6.591E-08	6.570E-08
8	Part.Pres	He	mbar	1.086E-10	1.079E-10
9					

11:50 inner vessel build-up test

Time [min]	Press [Pa]
0	8.7×10^{-3}
1	3.5×10^{-2}
1.5	5.3
~~2~~	7.0
3	1.0×10^{-1}
5	~~1.4~~ 1.6
~~7~~ 8	2.5
10	3.1
15	4.6
20	6.5



2.5 - 2.5 [kg/cm²]
368.59 - 518.59 2

13:45 inner vessel 8.3×10^{-3}
outer vessel 2.0×10^{-3}
P.S. line 7.2×10^{-4} Pa

14:00 start fill chamber with Xe → 2.0 atm

14:35 start pre-cooling

15:45 Electronics Set-up, some bug fixes.

- CIA boards replaced because two of three did not have correct output of ±5V and −5V. The boards were replaced and the mini cards on the previous boards were mounted. On the new boards Inserted into the FASTBUS and the clipping voltage was found to be correct on all the boards

- It was found that $\overline{OUT}$ was used in the 4-Fold-1-Veto coincidence module for trigger selection (upper NIM BIN). This should be OUT. Connected correctly.

- FASTBUS MASTER MODULE OUTPUT / INPUT Signals.

~~OUTPUT~~ OUT
TTL 4 → LED & PEDESTAL FLAG.
NIM 1 → Normal RUN (Electron & Gamma Trigger)
NIM 2 → α calibration RUN
NIM 3 → COSMIC RAY RUN

INPUT. NIM. 1 ← FLIP/FLOP (Event Latch) output.

9/April/03

15:55 RON 4800 Pedestal TEST RUN

No ADC Signal Cable connection.

Just for investigating mini-canals & DAQ.

No bad mini-canal! all pedestal histograms are fine.

17:30 RON 4801. Pedestal TEST RUN

After installing the fan-out.

ONE "NOISY" CHANNEL.

F10 S13-M25 · histo ID 1024

RMS 6.418.

Other channels : RMS $\lesssim$ 1.0.

20:33. Cable swapped. F10 ⇔ F25. @ Splitter output.
(Sig 1-25). (Sig 1-26).

Test run. # 4802. F10-RMS. 2.852. → smaller ??
F25-RMS. 0.220. Connector NG ??

The disconnection between Patch panel for Burndy and Splitter (Lemo cable connector) ~~was~~ causes the noisy channel.
→ Successfully repaired!

Now, All channels ~~are Good~~! RMS $\lesssim$ 1.0 @ All channel.
(However, HV off ...).

10/Apr/2003

10:00 Start flow Xenon

12:20 start liquefaction

12:50 set second pressure of ~~the~~ getter → 0.18 MPa (gauge)

10/Apr/2003

14:00 Take pedestal data to see the noise condition.

→ F10 S13-M25 C24 as noisy.

RMS 3.870 → OK fixed 18:00

17:25 ODB updated for controlling the HV.

1458 ~~Host~~ 10.244.69.193 → 150.29.206.128

1454 ~~Host~~ 10.244.69.194 → 150.29.206.180

SCPE_HVedit invoked with voltage setting of all zero. OK except one warning message!

"[odbxx.c,7026: db_open_record] struct size mismatch for "Equipment/HV/Statistics" (24 instead of 0)"

Not fatal but would be better to be fixed later.

⇨ This warning message has disappeared, often, making correct keys in the "Equipment/HV/Statistics" in odb.

11/~~01~~ Apr/2003

2:00 BK28 HV cable unplugged → plugged

HV cable 238

11/Apr/2003

21:50 HV on. Supplied voltages are save as "hvdata_24_Nov_2002/kekst_1e6_021202.hv"

→ Saved as "hvdata_11_Apr_2003/1e6.hv".

- ET1,2 of e-trig are set to 0

Active dividers are turned off because they often trip at the early stage after liquefaction.

Some PMTs show too much current.

ID	HV	current
L1	956	105.8
BT19	922	147.2

22:03 liquefaction completed

22:09 HV turned off for a while.

23:30. Cosmic Ray Trigger Counter test ⇨ All OK.

- HV setting for Trigger Counters.

* TC1	(Upper)	...	−2300 V.
	(Lower)	...	−1600 V.
* TC2	(Upper)	...	−1800 V
	(Lower).	...	−1800 V
* TC3	(Upper)	...	−2030 V
	(Lower)	...	−1850 V.

23:30. CIRCULATION START!

12/Apr/2003

0:23 HV on.

- Gain adjustment -- 50 hours later.
- d. CR run -- until HV and active dividers are stabilized.

12/Apr/2003

3:00 small chamber & long line evaccuate start

4:40 It seems HVs are stabilized. → Active dividers turned ON.

5:00 ADC gate - signal timing check
run #4805 ~ 4815

	NIM-threshold
PSC 1	-60mV
2	-100 mV
3	-60 mV
4	-30mV

# of LED intensity level = 6
{88, 90, 93, 96, 99, 102.}

1st run

6:00 #4816 pedestal run (5000 evts) not RMS
ADC #207 (BK1) pedestal σ ~ 5.2ch

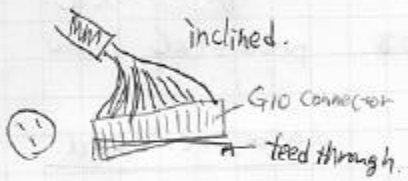
#4817 failed

6:37 #4818 LED run (6 x 5000 evts)

~~6:25~~

6:46 #4819 α run (30,000 evts)

No signal
→ ADC# 5, 132, 141, 159, 164.
172 ~ 179 ... the latter of G10-6
181 ~ 195 ... the latter of G10-7
221 ~ 227 ... the latter of G10-8



7:21 #4820 pedestal

7:23 #4821 LED run

~~9:29 #4822 α run~~ failed.

58 Signal check @ Burndy connector

T2 ADC #5 sig 1-6 ~~no signal~~ low gain

~~L2 #4 sig 1-5 strange noisy~~ 100 nsec

L26 132 sig 5-17 OK

L27 141 sig 5-26 no signal

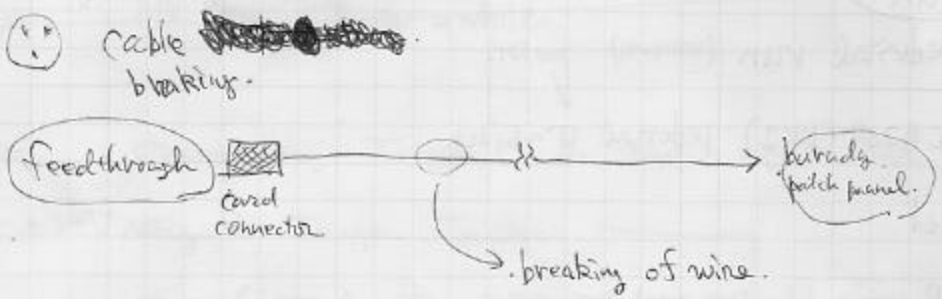
BT32 159 sig 6-12 OK

T34 164 sig 6-17 OK. → fixed, after replacing minicard

↳ Burndy pin moved 1→17 @ Sep 26 '02

Signal check @ ADC input

L26	132	11-65	×	no signal → repaired burndy connecter
BT32	~~141~~ 159	~~11-94~~ 11-92	×	no signal → fixed



Fixed! Using another unasigned cable. ⇒ OK.

All the PMTs is available.

13/Apr/2003

gain = 1×10^6

1
~~1~~3:14 # 4828 pedestal run ADC # 137 large Mean

↓

data removed

☺ circuit shorted because of the existence of something metal on the feedthrough.

→ removed.

42
~~37~~2: # 4829 pedestal run

3:00 # 4830 LED run → data removed

In "1e6.hv" supplied HV of BT31 was 1300.

It is changed from 1300 to 1200 in "1eb.030412.hv"

3:01 # 4831 pedestal run

3:03 # 4832 LED run

3:10 # 4833 α run

8:01 #4834 pedestal run

8:08 #4835 led run

8:14 #4836 alpha run

8:20 X #4837 CR run ⇒ failed ① ADC & TDC of TC ~~←mini card Cref~~ don't have data.

~~replace~~ ADC board (slot 11) → ~~fixed~~ replaced to new one
not recognized by FAL

11:27 X # 4838 pedestal @ 1e6

11:29 X # 4839 LED → failed

Software gain of CR Triggers were set 0 → changed to 1

13:11 # 4841 pedestal @ 1e6

13:13 # 4842 LED

13:26 # 4843 alpha

13:36 # 4844 cosmic ray

→ Very Strange Pedestal spectra.
- ADC No. 159 & 160. (BT32) (T35) ···· Same mini Card.
- All channels @ CIAFB, slot 9.

⇒ mini card exchanging. & Reference card replacement. → Fixed. OK.

20:08. Stop the RUN # 4844.

20:09. # 4845. pedestal. RUN.

22:30 47l Xe line < 1.7×10^{-3} Pa

circulation stop → 1 gallon cylinder, liquefaction start

23:00. #4847 pedestal RUN. Again.

23:09. #4848. LED calibration RUN.

23:18 #4849. α-ray RUN.

0:00 liquefaction from 1 gallon cylinder finished
start liquefaction from 47 l

0:32 #4850 cosmic ray run ← Somewhere in this run. ADC #-13 had broaden pedestal

03:04 HV error. (HV. 9-10.) L24. ●

See next page.

Paused # 4850, enabling HV via Web. and resumed.

06:55 TDC {L23 / R23} were left unplugged as they were in the KSR beam test for ET1 and ET2.

⇒ {L23 / R23} plugged to TDC {14-16 / 10-16}

14/Apr/2003

7:17 liquefaction from 47ℓ tank finished
~~0.2MPa~~ → 2MPa
" circulation restart. ⇒ See below ☆

7:35 LICON #3 ⟶ Selfer #0591 (250ℓ type)

7:45 #4850 CR stopped
7:45 #4851 pedestal
7:47 #4852 LED 185

→ ADC #0~95 (= slot 13)

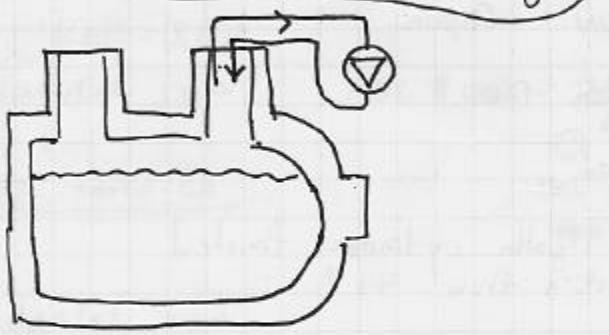
ref. card in ADC 13 was broken.
⇒ replaced.

~~#4853 λ run~~

data of #4851, 4852 removed.

8:12 #4851 pedestal
8:14 #4852 LED 185
8:20 #4853 λ run
8:26 #4854 CR run

13:00 ☆ Circulation path was wrong! (probably since this morning after liquefaction from 47ℓ tank)
Xenon vapor was circulated in the back chimney



→ No purification during this period
(No LN_2 consumption)

13:30 circulation restarted.

15:52 #4854 CR run stopped ~~strange pedesto~~

#4855 pedestal ⇒ strange pedestal for F30 (S11-M10 ch05)
↳ Don't use → fixed by replacing mini card

16:05 #4856 pedestal. 5548 evts

#4857 LED 1&5

16:42 #4858 ~~α run~~ pedestal

47 #4859 α run

16:53 #4860 CR

17:08 #4860 stopped for HV adjustment (gain match to 1e6)

17:10 #4861 pedestal ⇒ no pedestal data for (S11-M15) F35
↳ Don't use → fixed

17:59 #4862 pedestal for gain match to 1e6

~~17:20~~ 18:01 #4863 gain match run to 1e6 (1st)

18:13 #4864 " (2nd)

18:24 #4865 " (3rd)

18:25 #4866 " (4th)

⇒ saved as 1e6_030414.hv

18:54 #4867 pedestal

18:55 #4868 LED185

19:07 #4869 pedestal.

19:08 #4870 α-run

19:15 #4871 CR run

15/Apr./2003.

01:30. Stop the RUN #4871. ~400 events triggered.

01:33 #4872. pedestal run.

01:34 #4873. LED calibration run.

01:42 #4874 α-run.

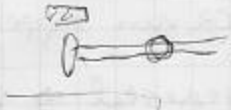
02:02. #4875. Am/Be (@ front of F15.)

--- Triggering scheme is ordinary "γ-trigger".

02:41 Stopped. RUN #4875. 50000 events triggered.

02:44 #4876. Background measurement.

15/ Apr./2003



04:12 · #4877 Cosmic Ray RUN

06:42. breaker (@ Elec. rack with Splitter & FB) down.

Stop the RUN. #4877.

MIDAS cannot wake up! · (oo) Connection error occured @ HV supply (LRS1454).

SCFE restart. ⇒ NG
HV supply shutdown and restart, SCFE restart again.

07:00. #4878. Cosmic Ray RUN.

08:05 #4878 stopped

8:05 #4879 pedestal -- ~~ADC# 207 was wrong~~ pedestal

ADC#	ped
140	3.14 ch
147	3.10 ch
207	4.69 ch

8:08 #4880 LED 1 & 5 —

ADC #	gain
50	0.79×10^6
127	1.84×10^6
222	0.72×10^6
105	uncalibrated

→ active divider ⟷ FASTBUS ADC

8:16 #4881 α run

8:16 #4882 CR run

short!! Not fixed

open

11:35 #4882 stopped

12:39 #4883 CR start

16:00 ~~#488~~ stop 4883

16:01 #4884 pedestal

16:03 #4885 LED

16:10 #4886 α

16:15 #4887 CR

18:55. LN_2 Selfer exchange, new one: # C0589

19:39 #4887 CR run stop

DAQ PC shutdown to install new HDD

but. IDE controller or BIOS broken

20:39 #4888 pedestal

20:40 #4889 LED

20:47 #4890 α

20:55 #4891 CR

Xe press Ctl range	flow rate
1.33 ~ 1.35 atm	~ 7 ℓ/min
~~1.3~~ 1.43 ~ 1.45 atm	~ 83 ℓ/min
1.42 ~ 1.44 atm	~ 5.0 ℓ/min

16/Apr./2003.

0:57. Stop the RUN #4891.

0:58. #4892. pedestal.

0:59. #4893. LED calibration RUN

1:10. #4894. α-ray RUN.

1:21. #4895. Am/Be. ("α" trigger). 200000 events.

1:59. #4896. ^{60}Co. ("α" trigger) "

02:38 #4897. Am/Be ("γ" trigger) "

05:22 #4898. Backgrounds measurement. ("γ" trigger). 100000 events

07:11 #4899. Cosmic ray RUN.

13:00 #4899 stopped.

13:00 #4900 pedestal run

13:03 #4901 LED calibration run.

13:10 #4902 α run

13:16 #4903 CR run

S

21:26 #4903 stopped

21:27 #4904 pedestal : ADC#207 has a pedestal with σ of 4.5ch.
⇒ minicard replaced. but ADC#207 is opened. ZP=∞.

X 21:36 #4905 pedestal Not fixed.

21:43 #4906 pedestal

21:47 #4907 LED calibration

64 16/Apr/2003

21:54 #4908 α run

21:01 #4909 CR run

17/Apr/2003

5:56 #4909 stopped

#4910 pedestal

6:06 #4911 LED calibration (1&5) →

ADC #	gain
10	0.779×10^6
50	0.784×10^6
76	0.6996×10^6
105	No signal
111	1.219×10^6
127	1.766×10^6
155	0.6496×10^6
222	0.665×10^6

6:12 #4912 α run

6:19 #4913 CR run

12:52 Stop the RUN #4913.

12:54 #4914 pedestal.

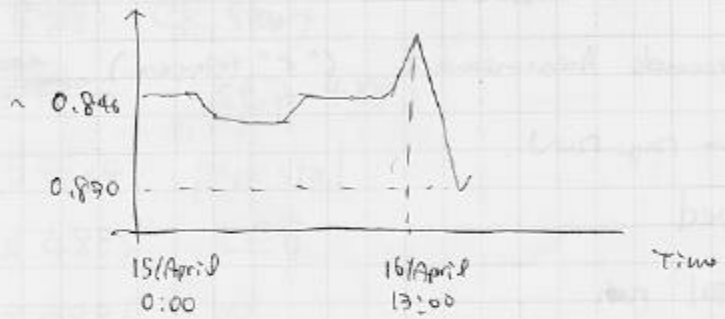
12:55 #4915. LED calibration run.

13:02 #4916. α. Run.

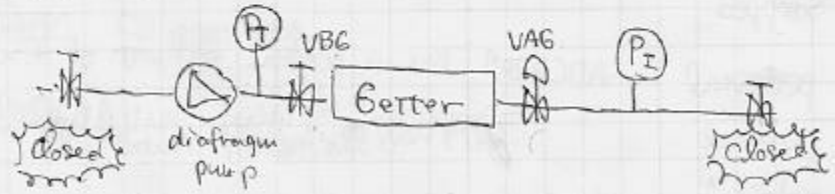
14:49. #4917. Cosmic ray run.

16:00 ~ 20:00.

The Surface level meter. seemed to indicate that the surface level was going down gradually from around 13:00 today. History of the surface level meter is like the following.



This might be caused by xenon leakage in the circulation line. For investigating the problem, firstly the circulation was stopped. And pressure was monitored before and after the Getter.

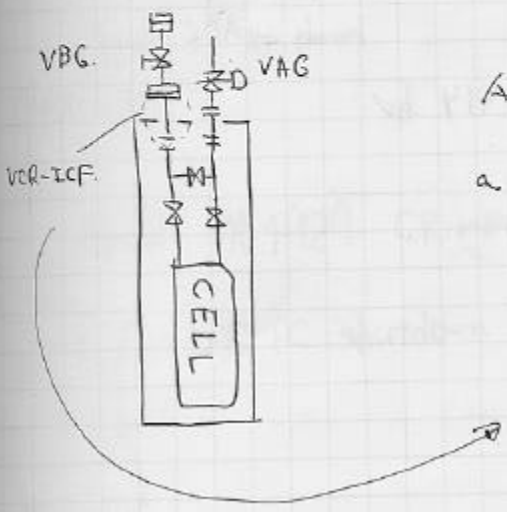


~ 1kPa / minute decrease! MUST BE LEAK

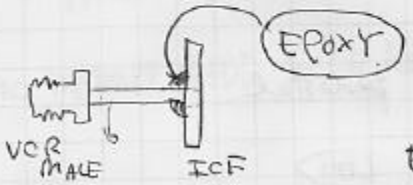
When we closed the valves, VBG (Valve befor the Getter) and VAG (Valve after the Getter), pressure drop could not be observed.

When we close one (only one) of VBG and VAG, the pressure of the Getter side decreased while the other side stayed constant (almost).

⇨ LEAKAGE BETWEEN VBG and VAG



After investigation, using the leak detector, a leak was found at a VCR-ICF TRANSDUCER.



EPOXY is PUT at the suspicious welding position

⇨ OK, Leakage fixed

Evacuation of the purification line before starting the circulation again.

- SURFACE LEVEL ~~XXXXXXXXXXXX~~ Returned to the normal value during this fix up. ~~Cecil~~

⇨ Level shift was not due to the leakage.

SUMMARY

- There was a leakage point, which is fixed now.
- Level meter output is sometimes unstable. Level shift found at 16:00 was a fake

21:00	P.S. line	~~2.3~~ $\times 10^{-3}$ Pa
21:41		2.0×10^{-3} Pa
22:20		1.7×10^{-3} Pa
23:03		1.5×10^{-3} Pa

23:46 stop 4917

23:47 #4918 pedestal

23:49 #4919 LED

23:55 #4920 α

ADC#105 No signal @ burndy panel. → ~~fixed~~

52.2Ω. burndy ⇔ ADC short

Not fixed

load hv data leb-30414.hv

18/Apr/2003

0:52 #4921 pedestal

0:~~53~~ 54 #4922 LED

1:02 #4923 α

1:03 #4924 CR

2:20 P.S. line 9.4×10^{-4} Pa

2:45 Circulation restart → dew point −65°C

2:21. Stop the RUN #4924.

previous Cosmic Ray RUN (#4924) has only 26 events.

⇒. HV (1458) has been down.

SCFE & HV supply restart.

2:28. #4925. Cosmic ray RUN.

7:53 stop 4925

7:54 #4926 pedestal

7:55 #4927 LED

8:01 #4928 α

8:06 #4929 CR

10:05 #4929 run pause. (because of beam is used.)

10:10 #4929 restart.

11:55 Cooling FAN for the diaphragm pump is switched on.

The dewpoint started to decrease!? why ???

15:25 LN_2 Dewar exchanged.

16:21 #4929 CR run stopped.

DAQ PC shutdown to install HDD & IF board.

19/Apr/2003

1:50 installation completed. SCSI : PCI board → on-board
IDE : +120GB & ATA133 (drive ~~HDD~~)

New data storage on Win2K DAQ PC
D:\030401_030430_teras3\

2:~~20~~40 #4930 pedestal
2:21 #4931 LED
2:28 #4932 α
2:34 #4933 CR
3:00 ADC #105 (G10 #4-10) : ~~moved~~ moved burndy ~~pin~~ pin 4-10 to 4-43 on burndy plug Sg 10.
↳ ADC #105 fixed.

8 19/Apr/2003

3:12	#4935	pedestal
3:13	#4936	LED
3:19	#4937	α
3:25	#4938	CR
7:57	stop 4938	
7:58	#4939	pedestal
7:59	#4940	LED
8:06	#4941	α
8:11	#4942	CR

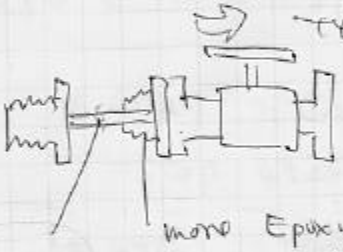
14:10 Xenon transfer line for the PMT test chamber was removed. After this leakage test around the Getter was performed again for confirmation.

⇨ Pressure decrease was monitored as in the same way as PG4 and leakage was found again.

20/Apr/2003

Investigation of the leak position using the leak detector.

⇨ the same part is suspicious!



Tiny "hole" found, on which epoxy was put

After molding with EPOXY, leak test was performed and was found that the leakage had disappeared.

18:00 Evacuation of the perification line again

18:25 9.1×10^{-4} Pa

18:53 7.2×10^{-4} Pa

20:00 5.9×10^{-4} Pa

20:28 #4942 stop

20:30 Circulation restart.

Inner Xe pres. ~~range~~ range: 1.42 ~ 1.44 atm. expected flow rate: ~ 8.0 ℓ/min

20:39 #4943 pedestal

20:41 #4944 LED 1&5 HV error → re-take.

20:52 #4945 pedestal

20:56 #4946 LED

21:03 #4947 α

21:09 #4948 CR run w/ Circulation

20/Apr/2003

7:47

9:25 #4949 pedestal

9:27 #4950 LED

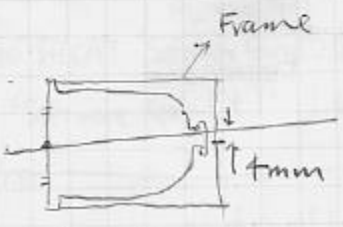
9:33 #4951 α

9:39 #4952 CR run w/ Circulation

8:00

10:30 Detector is roughly aligned to the beam path on 19th of Feb '02 ⇒ should be re-aligned tomorrow

slightly slanted



(top view)

20/Apr/2003

16:52 stop 4952

16:53 #4953 pedestal

16:58 #4954 LED

18:30 #4955 α → failed

18:31 #4956 α

18:36 #4957 CR

21:18 stop 4957

23:18 #4958 pedestal

23:19 #4959 LED

23:45 #4960 α

23:53 #4961 CR

21/Apr/2003

05:40 Stop #4961.

05:42 #4962. pedestal.

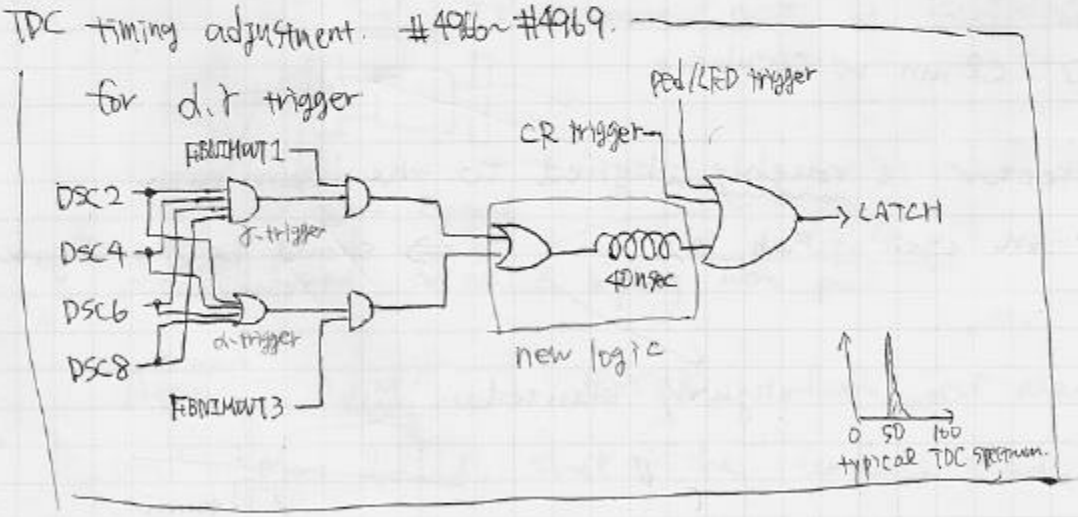
05:53 #4963 LED

06:00 #4964 α

06:06 #4965 CR

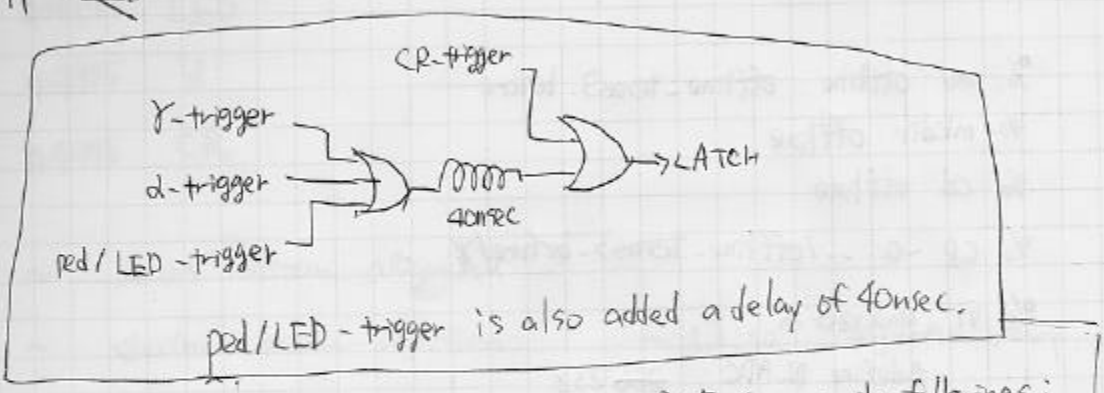
9:30 #4965 stopped

TDC timing adjustment. #4966~#4969.



21/Apr/2003

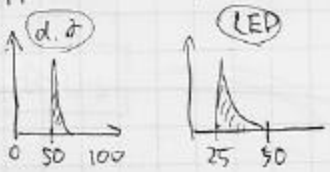
11:01 ~~#4970 pedestal~~
11:02 ~~#4971 LED~~



ped/LED-trigger is also added a delay of 40nsec.

NOTE: ADC timing charts in P.57 become the followings:

• typical TDC spectra.



11:18 #4970 pedestal
11:20 #4971 LED
11:24 #4972 α

Added 2 ADC channels for ET3 and ET4

New 'fal' is needed. in win2k.

fal

adccalib.c — char *adc_channel_name[N_ADC] = {...
..., "ET1", "ET2", "ET3", "ET4"
added
};

frontend.c — CHANNEL_MAP adc_map[] = {...
..., {9, 74}, {10, ...}, changed from 72 to
};

analyzer.h — #define N_ADC 238 changed from 236 to

odbedit

```
>cd Analyzer/Parameters/"ADC calibration"
>del pedestal
>del "pedestal sigma"
>del "Software Gain"
>create FLOAT "Pedestal[238]"
>create FLOAT "Pedestal Sigma[238]"
>create FLOAT "Software Gain[238]"
>set "Software Gain[*]" 1.0
>make
```

then compile 'fal'!!

21/Apr/2003

New "analyzer" is needed. in Linux.

```
% mv offline offline_teras3_before
% mkdir offline
% cd offline
% cp -a ../offline_teras3_before/* .
% vi analyzer.h
      #define N_ADC   ~~236~~ 238
% odbedit
  $ ~~Do the same~~ as previous page.
```

"experim.h" was manually changed.
"Pedestal", "Pedestal Sigma", "Software Gain"

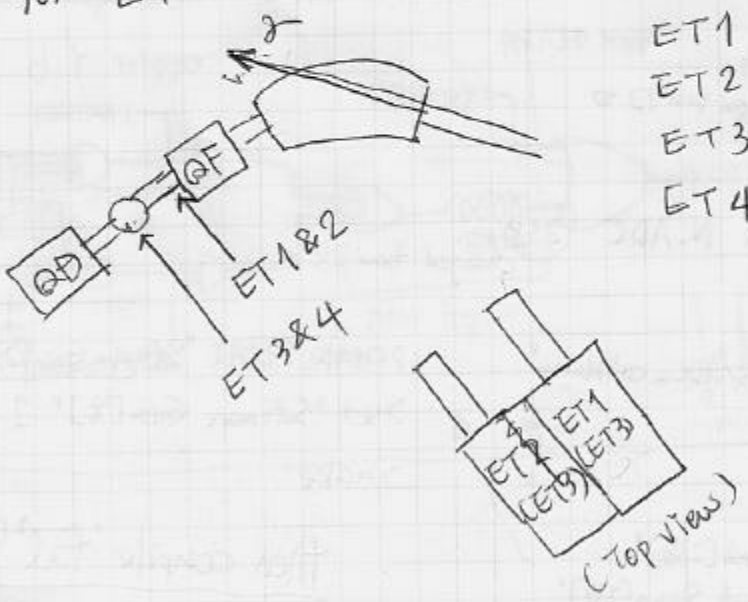
```
% make clean
% make
```

Run # 4800 ~ #4972 ~/offline_teras3_before/ 236 ADCs

Run # 4973 ~ ~/offline/ 238 ADCs

Set the environmental variable 'MIDAS_DIR' as above to run 'analyzer'.

PMTs for ET



	PMT S/N	HV	Discri
ET1	CA3218	+1900V	−20mV
ET2	CA3116	〃	〃
ET3	CA3136	〃	〃
ET4	CA3015	〃	〃

13:02 #4973 pedestal

13:03 #4974 LED

13:16 #4975 α

13:25 #4976 CR

14:00 ~ Laser system alignment.

16:30. ~ electron beam injection. ~ 17:10. Injection stop.

16:49. #4986 Stopped.

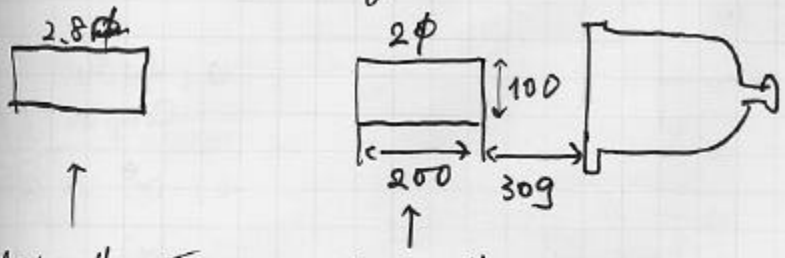
17:25. #4987. pedestal run ← SR ON. (Beam shutter Open)

#4988 pedestal run again. ← SR off (Beam shutter Closed).

BEAM : 209 mA.

Collimator alignment. Laser firing

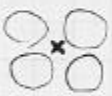
Collimator setting



18:31. #4989. pedestal run. @ Beam ON.

18:33 #4990. γ-Beam. 40 MeV. ~ 30 Hz. 50000 events.

γ incident on center of detector.



19:02 #4991. γ-Beam. 40 MeV. again., 50000 events.

19:24. Laser. OFF. γ TRIGGER ON TRIGGER Rate ~70 Hz

DEAD TIME ~ 0%

#4992. γ run. (triggered by SR).

40 MeV γ
Before Alignment

21 / Apr. / 2003.

19:49. Laser ON.

19:50. #4983. pedestal run @ 1e6. γ-Beam ON.

19:54 #4984. LED calibration RUN.

20:01 #4985. α run @ with SR., laser ON

20:02 #4986. 40 MeV. γ-beam Run. ~ 3 kHz. 50000 events.

20:35 #4987. 40 MeV γ-beam RUN.

21:04 #4988 40 MeV γ-beam RUN

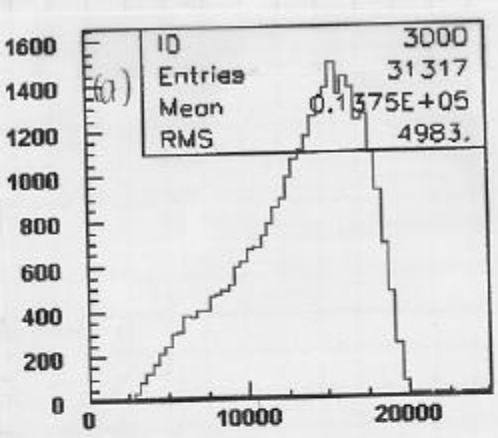
21:39 #4989 40 MeV γ-beam RUN

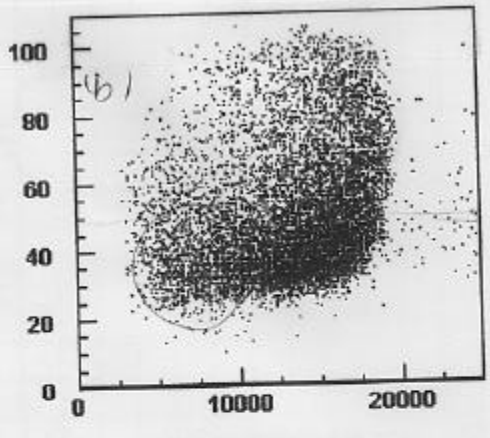
22:12 #4990 40 MeV γ-beam RUN ~24Hz

22:49 #4991 40 MeV γ-beam RUN ~22 Hz

23:25 #4992 40 MeV γ-beam RUN ~22Hz

500000 events Recorded.





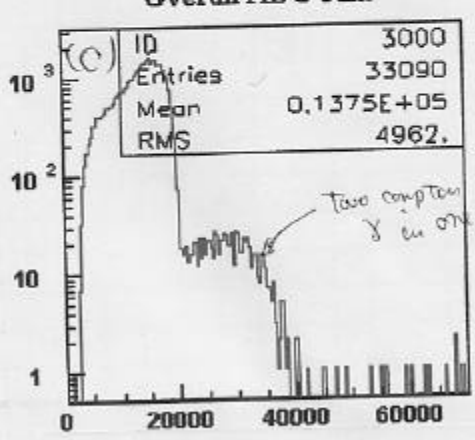
(a) 40 MeV Compton-γ peak

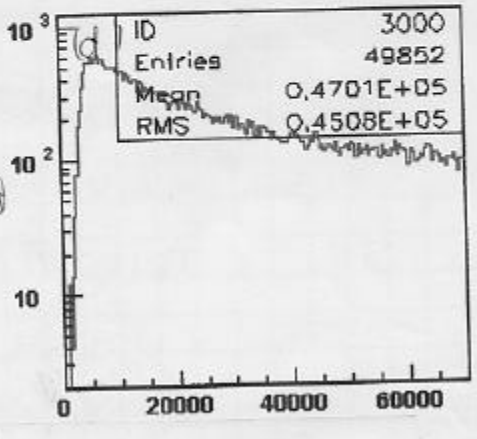
(b) σ vs. QSUM

(c) 40 MeV Compton-γ.

(d) Synchrotron Radiation event

RUN 4982





22/Apr/03

0:03 #4993 Pedestal RUN @ 1e6 γ-Beam ON

0:05 #4994 LED RUN @ 1e6 γ-Beam ON

0:13 #4995 α RUN @ 1e6 γ-Beam ON

0:28 #4996 TEST RUN FOR Electron Tag counters γ-Beam ON ?????

Nothing was done due to the RF trouble

Found that beam is off ??

0:58 #4997 pedestal
0:59 #4998 LED
1:10 #4999 α run.
1:18 #5000 CR

Due to an RF Trouble, beam has disappeared ....
The same problem, Okyaki-san said, happened last Friday.

NO BEAM. TIL TOMORROW MORNING.

Directory for "rz, par, ped-dat, gain-par, calibra-.ps" moved

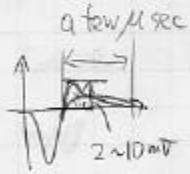
/scratch②/muegamma/030407-030428-teras3

⇓

/scratch①/muegamma/030407-030428-teras3

ADC#222 cannot be calibrated.

because of over-shoot.



22/Apr/2003 CAMAC scaler installed. "You can see by "ht/pri 2".

- CH0~7 available
- Not assigned.
- /Equipment/Scaler/Common/Period is in [msec]

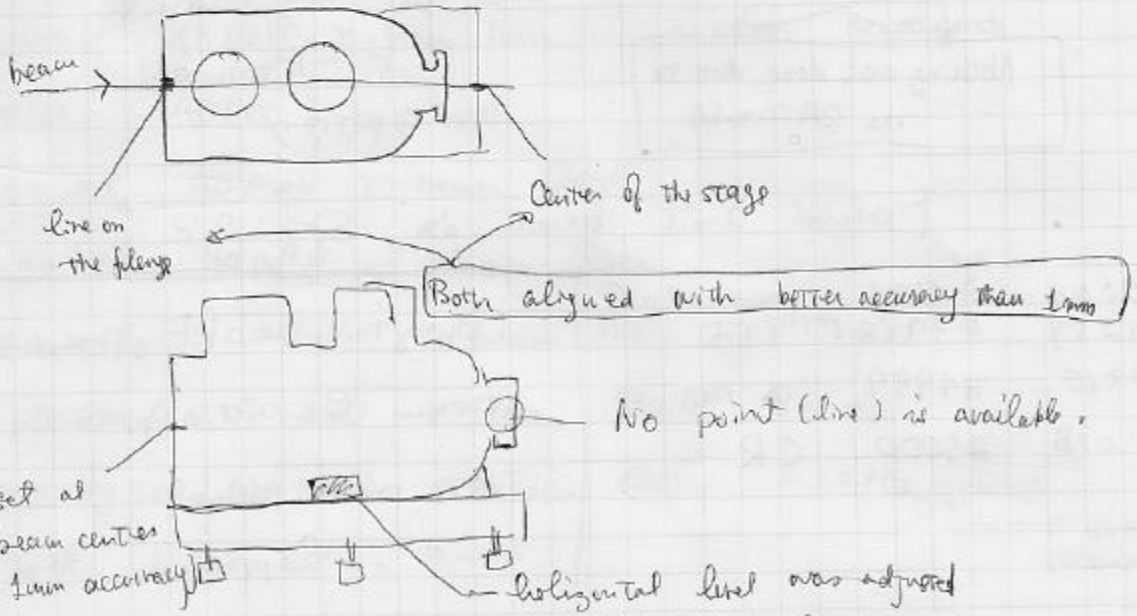
3:15
~~3:04~~ #5001 pedestal

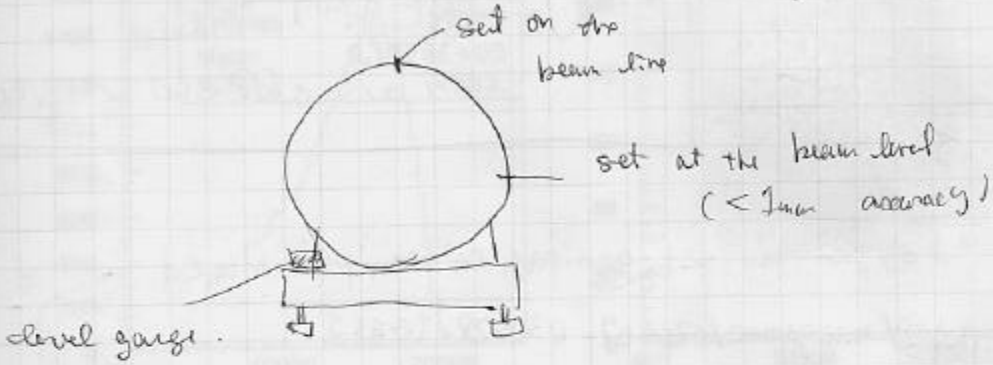
3:17 #5002 LED

3:24 #5003 α

3:32 #5004 CR

1:30~6:00 detector alignment Again



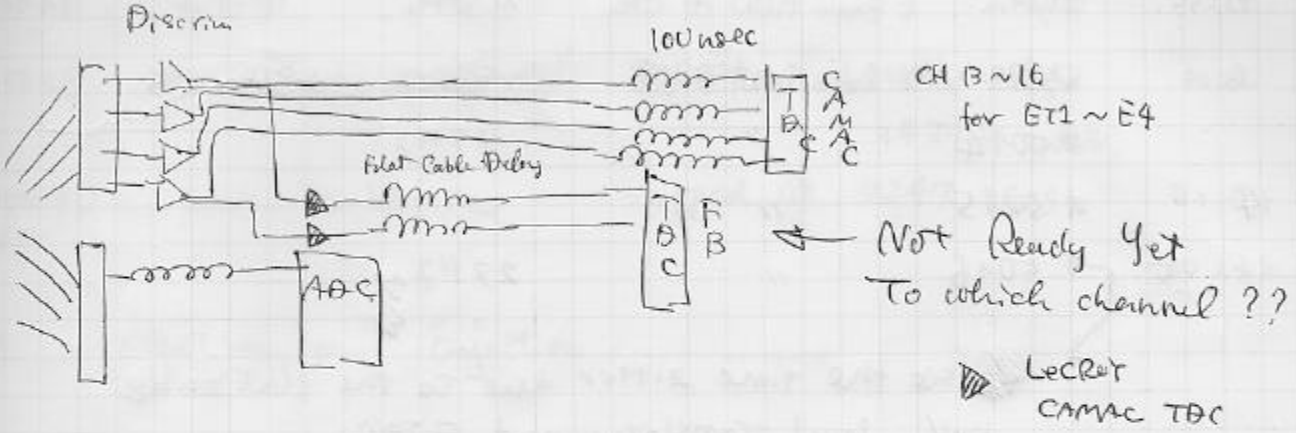


6:45 CAMAC Scaler channel assignment

0: Trigger (event request)
1: Accepted event.
2: γ trigger
3: α trigger
4: Number of events if more than one hit in the 1st CAMAC disc
5: " 2nd "
6: " 3rd "
7: " 4th "

22/April/2003

TDC CABLE CABLING for Electron Tag Counters



TDC timing is not checked yet due to the RF trouble of TERAS.

① Histogram titles for CAMAC TDC were changed.
Please re-compile before starting the next RUN.

10:39 ② Changed Normal run (γ-run) to (Normal run ⊕ CR run).

... frontend.c

Electron Injection After RF Trouble fix up

10:47 #5004 CR stopped for Electron Injection → useful data

#5005 γ-run ET 1,2,3 4 TDC timing adjustment (30,000 events)

— fal compiled for ①.②

11:13 #5006 γ-run + CR ↓ 49677 events ~ 300mA

40MeV γ

11:43 #5007 pedestal
11:45 #5008 LED
11:53 #5009 α
} γ beam ON

12:02 #5010 γ-run + CR 30000 events taken.

12:19 #5011. γ-run ⊕ CR. 30000 events triggered.

22/ Apr. /2003.

12:35. #5012. γ Beam RUN @ CR. ~30 Hz.

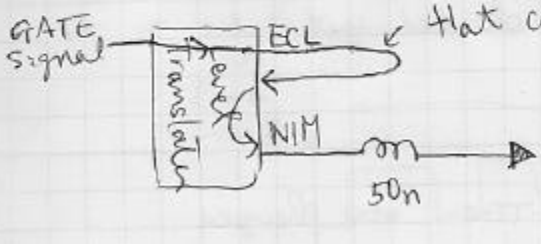
13:04 #5013 γ Beam RUN @ CR. ~~27Hz~~ 4.9635 MeV

#5014 〃 ~27Hz

14:10 #5015 〃

14:45 #5016 〃 27Hz

→ see the time zitter due to the flat cable bw/ level translator and FTDC,



15:42 #5017 γ Beam run @ CR ~27Hz

16:17 #5018 γ Beam run @ CR ~23Hz ~60mA

460000 events taken (RUN #5006 ~ #5018)

"After Electron Trigger Counter timing adjustment"

2nd collimator removed.

40 MeV γ (w/o) Collimator (3.85mmφ)

16:53 #5019 pedestal gamma beam ON without 2nd collimator

16:54 #5020 LED 〃

17:01 #5021 alpha 〃

~90Hz.

#5022. γ-Beam Run. w/o 2nd collimator. 30000 events.

17:16. #5023. γ-Beam Run. w/o 2nd collimator. 56000 events.

laser turned off.

#5024. SR run. w/o 2nd collimator.

#5026 γ-Beam run w/ 3.85φ 2nd collimator

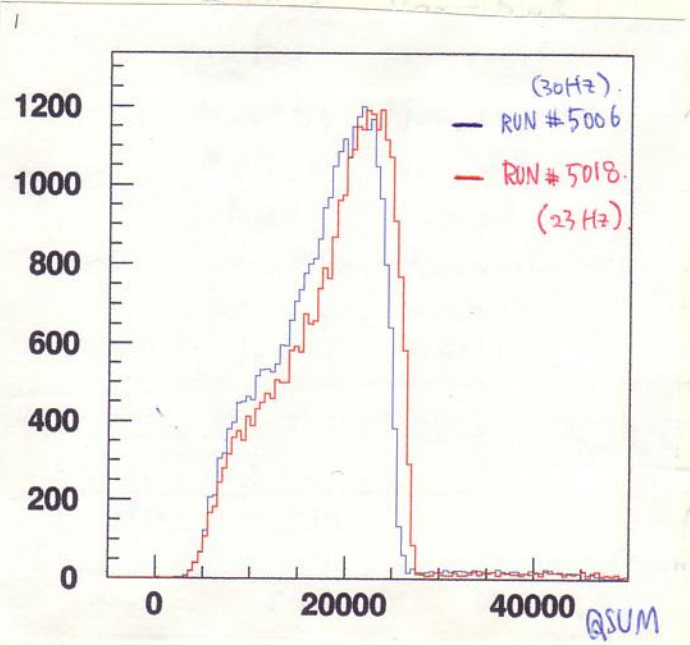
18:07 #5027 pedestal gamma beam ON w/ 2nd collimator 3.85φ

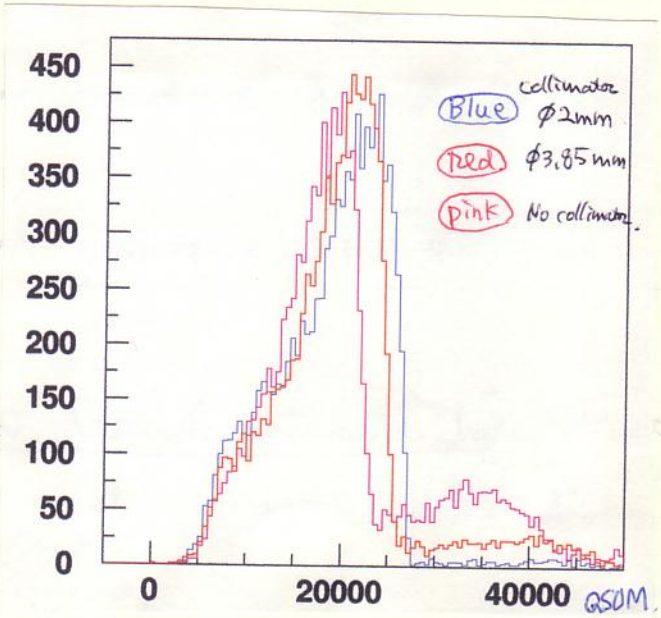
#5028 LED 〃

#5029 γ-Beam run w/ 3.85φ 2nd collimator 14714 evts.

#5030 same as before stopped @ 4247 evts

18:45. electron beam injection





19:15. injection completed. ⇒ 259 mA

19:19 #5031. γ-Beam run w/ φ3.85mm @ 2nd collimator, ~90 Hz.
Laser current : 35 A. 13000 events triggered.

19:22. #5032. γ-Beam run, same as previous run. 30000 events.
Trigger rate w/laser veto ~350 Hz laser : 35 A
~~w/o~~ w/o laser veto ~3 kHz

scaler input changed
ch1 : accepted events ⇒ raw trigger rate w/o laser veto

Effect of Laser Current

w/ 3.85 mmϕ 2nd collimator

19:52 #5033 γ-beam run — e-current 217mA; 2nd collimator : 3.85ϕ; laser : 25A

$\Rightarrow$ Trigger rate ~ 5Hz

2438 events

#5034 γ-beam run — e-current 210 mA; 2nd-colli : 3.85ϕ; laser : 30 A ~50Hz

Strange data?

bad calibration? #5035 γ-beam run — e-current ~~200~~ mA; 2nd-coll. 3.85ϕ; laser : ~~30~~ 35A

#5036 γ-beam run — e-current 193 mA; 2nd-coll 3.85ϕ; laser : 30A ~50Hz

#5037 γ-beam run — e-current 183mA; 2nd-coll 3.85ϕ; laser 28A ~40Hz

20:51 2nd collimator changed to 1mmϕ

40 MeV γ w/ collimator (1mmϕ)

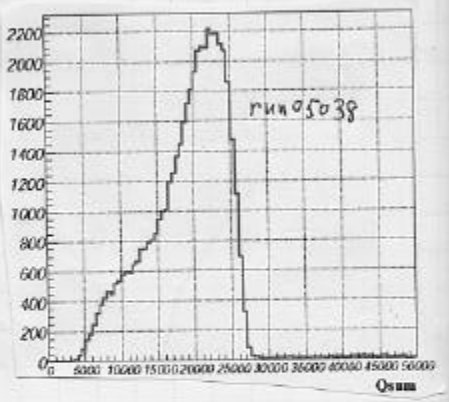
#5038 γ-beam — laser 35A; 2nd coll. 1mmϕ; e-current 169mA — rate ~20Hz — 50000 evts.

21:40 #5039. same as before — e-current 135 mA; rate ~ 12 Hz — 50000 evts.

22:42 #5040. γ-beam run. Same as previous run. (114 mA., rate ~12Hz).

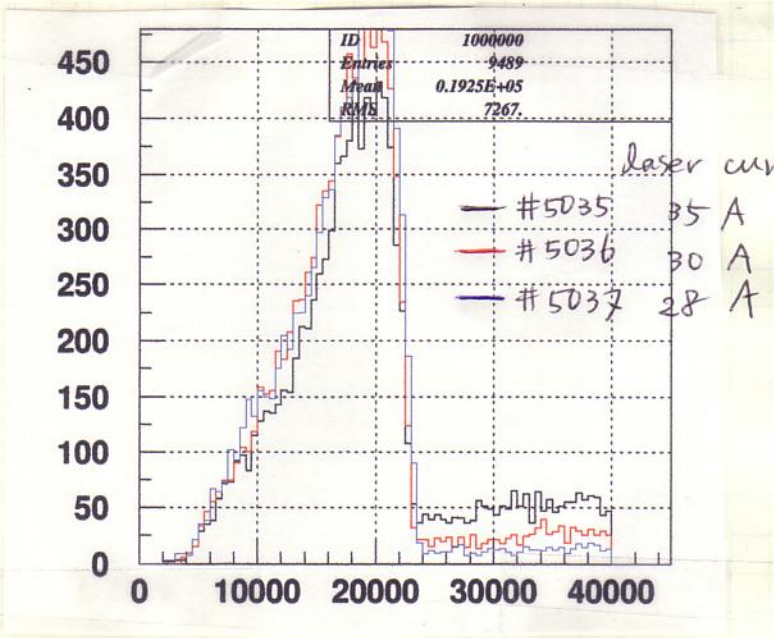
23/Apr./2003.

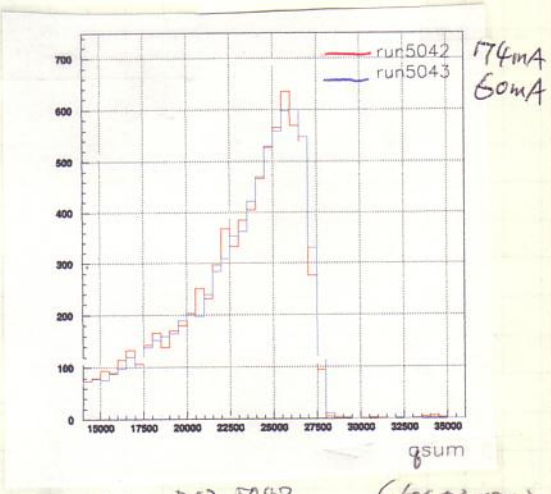
0:02 #5041 γ-beam run. Same as before. (93mA., rate ~10Hz.).

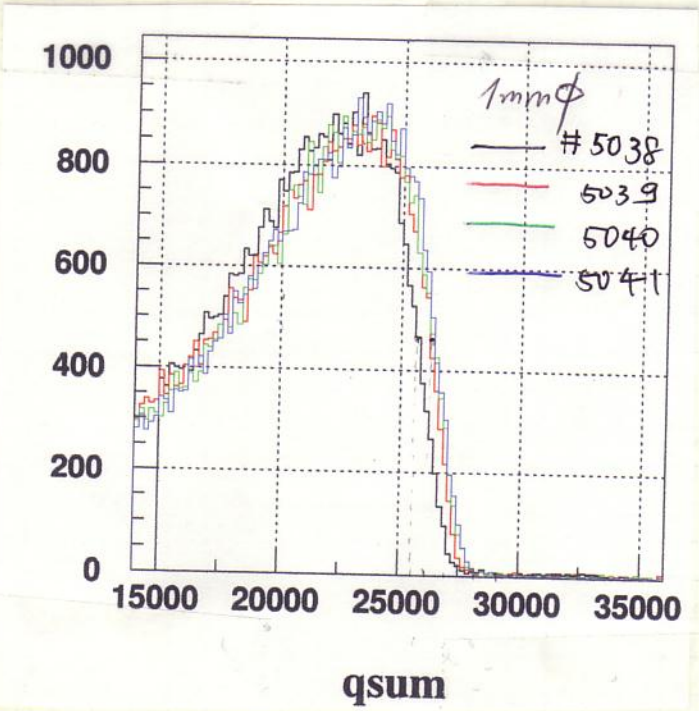


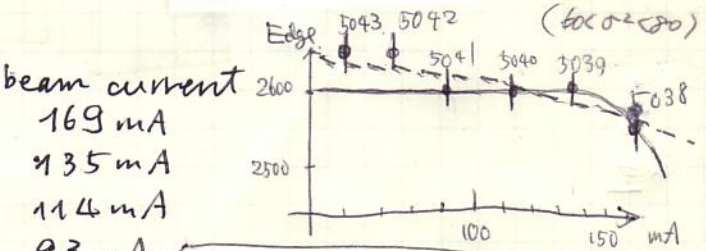
1:29. #5042. Same as previous run. (74mA. rate. ~9Hz).

2:59. #5043 Same as previous run (60mA. rate ~8Hz). ~300000 events //.

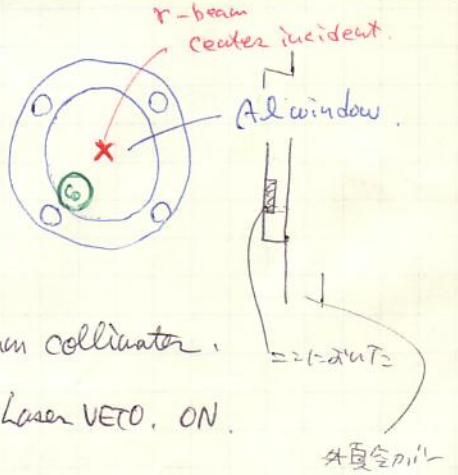








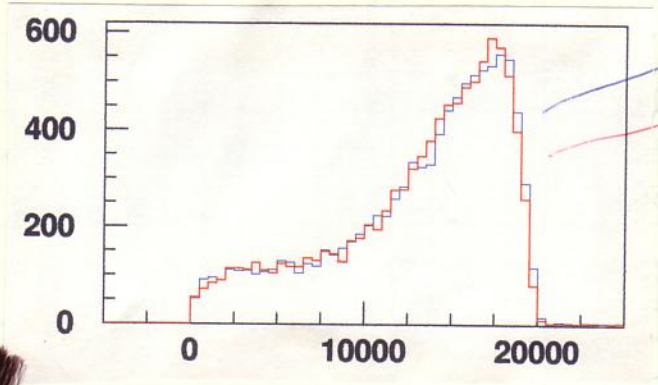
Found that the activity of the Co source is 10μCi, not 100μCi!! on 23/April



BG Effect using Co

4:55. #5044. γ-Beam + ^{60}Co, w/ φ1mm collimator.

(Beam current 49mA, ~ 6 Hz). Laser VETO. ON.

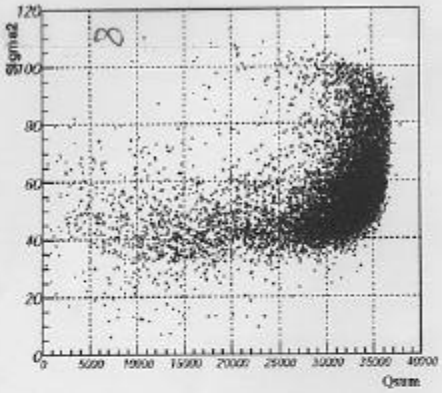


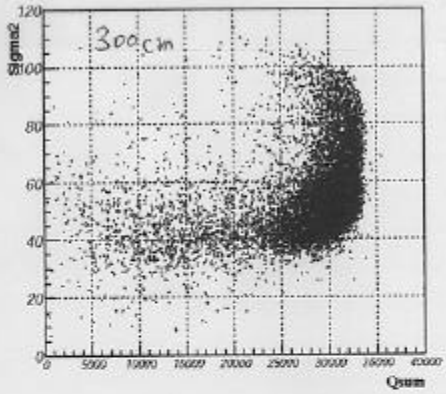
NO significant difference.

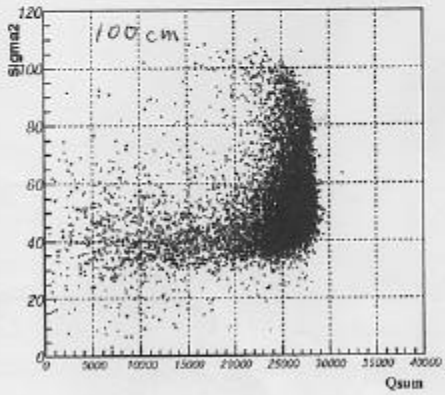
↑

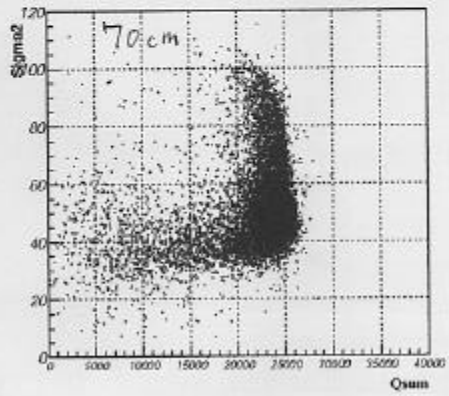
明らかに Co ターゲットの方が低エネルギー側へ shift している。

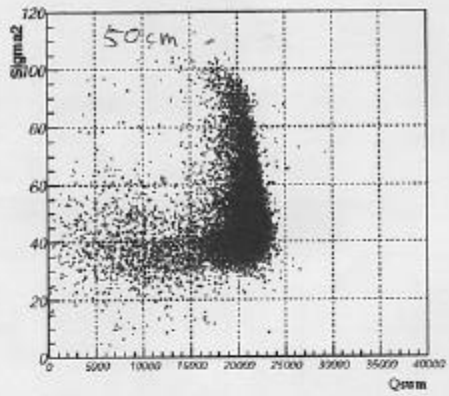
MC

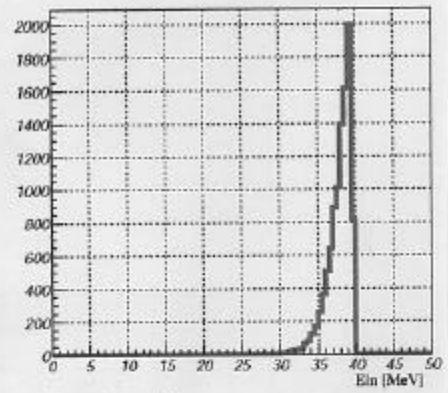










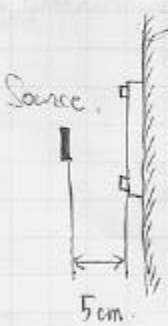


Wph 21.7 MeV
raley 50cm
Ri(Xe) 1.61
Ri(quartz) 1.49

quartz window (reflection on
absorption on

extra xenon 0cm

07:44. #5045. γ-Beam + ^{60}Co.
(beam current : 40mA., ~5Hz).
~25000 events



Off the beam line
as in #5044.

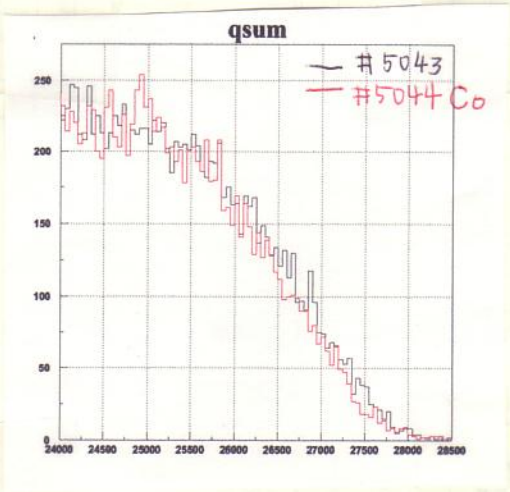
8:19 #5045 stop

8:20 #5046 Pedestal for RUN # 5045 Co at 5cm away from the cover.

8:22 #5047 LED for RUN #5045

This is found to be OK in offline analysis. 97.5.27 NIS

23/April/03

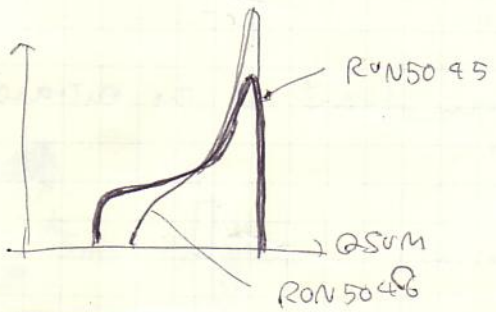


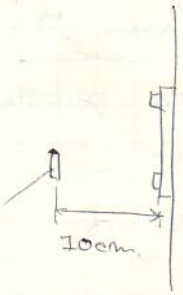
8:35 #5046 γ-Beam + ^{60}Co

(beam current : 50nA Trigger Rate 5Hz)

This is found to be OK in offline histogram 22/April. SM 15:46

Spectrum shape changed at low energy side on the online histogram?





Off the beam line as in #5044

9:34 stop for injection

(8832 events

Electron Tag Counter HV off during injection

9:35 #5049 Pedestal for RUN #5046

9:36 #5050 LED for RUN #5048

9:45 Injection started

Co Source is set to the position for RUN 5044

10:45 End of Injection

10:46 #5051 Pedestal for RUN #5044

10:47 #5052 LED for RUN #5044

During Injection, DAQ could not be performed due to FAL Trouble "No ADC GATE!" BUT THIS IS FIXED W/O DOING ANYTHING

27/April/03

HV for Electron Tag Counter Reset
To the nerumal value

Co source removed.

10:55 Laser tuning.

RUN 5053 DAQ during Laser tuning
Do not use this data for analysis.

RUN 5053 end

X 11:32 #5054 Pedestal No Co source.
Beam off (Shutter closed)

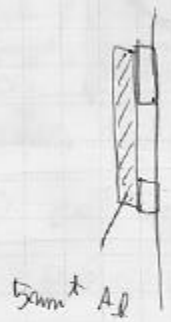
X 11:34 #5055 LED Beam off

beam on

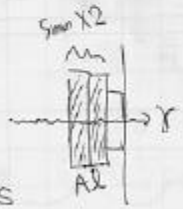
40MeV γ Material Effect

12:06 #5054 pedestal -- #140, #225 pedestal σ ≈ 3,4ch
12:08 #5055 LED 182mA
12:15 #5056 α

5mmt Al plate is placed in front of the entrance window



12:20 #5057 γ beam RUN - 5mmt Al in front of the window.
180mA ~ 149mA 50,000 events, 16.4Hz ave.



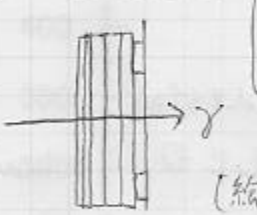
13:19 #5058 γ beam run. 10mmt Al
146mA ~ 123mA 50,000 events

14:19. #5059 γ Beam RUN 15mmt Al (10mm + 5mm)
721 mA ~ 50000 events

15:31 #5060 pedestal
15:33 #5061 LED
15:39 #5062 α
15:45 #5063 γ Beam run
96 mA ~

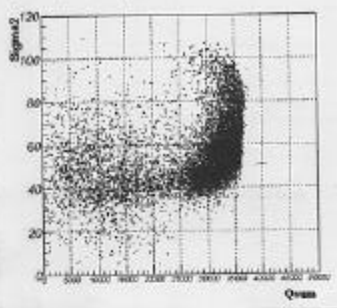
15 mmt Al + 4mmt SUS430
0.398 X_0

SUS 430
X_0 - 1.75 cm
4mmt → 0.229 X_0
18% Cr
82% Fe

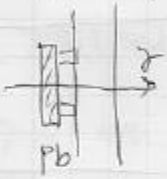


(紙なウソ)
~~3 × 5mmt~~ 10mm Al + 2 × 2mmt SUS
+5mmt Al

(0,0) absorption 00 , 0.8cm Xe extra.



17:10 5mm Pb plate is placed in fron of the detector



17:10 #5064 γ-beam run beam 76 mA
rate 7.0 Hz.
5mm thick Pb plate
18857 events.

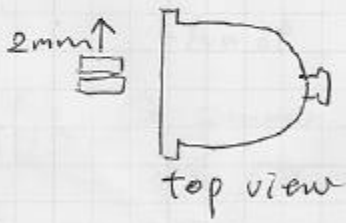
17:45 #5065 γ-beam run same as before
but coincidence level at the trigger
changed to 3

11075 evts ⇐ rate ~10 Hz
beam 67mA @ 18:00

86 Pb plate removed

18:07 #5066 γ-beam run beam 66mA
rate ~ 10Hz
13011 evts ⇐ without Pb plate
coincidence level 3

18:31 #5067 γ-beam run beam 62mA rate ~10Hz
same condition as before
but
7586 evnts collimator shifted to the left by 2mm



18:42 #5068 pedestal
18:44 #5069 LED γ-beam on
#5070 alpha " beam 59mA
18:57 #5071 γ-beam run beam 59mA
rate ~2Hz
same as #5067 but
detector shifted further by 2mm
(4mm in total)
19:02 #5072 γ-beam run beam 57mA
rate ~ 5.0Hz
detector shifted to the right by 2mm

Position Scan

20:10 New Injection

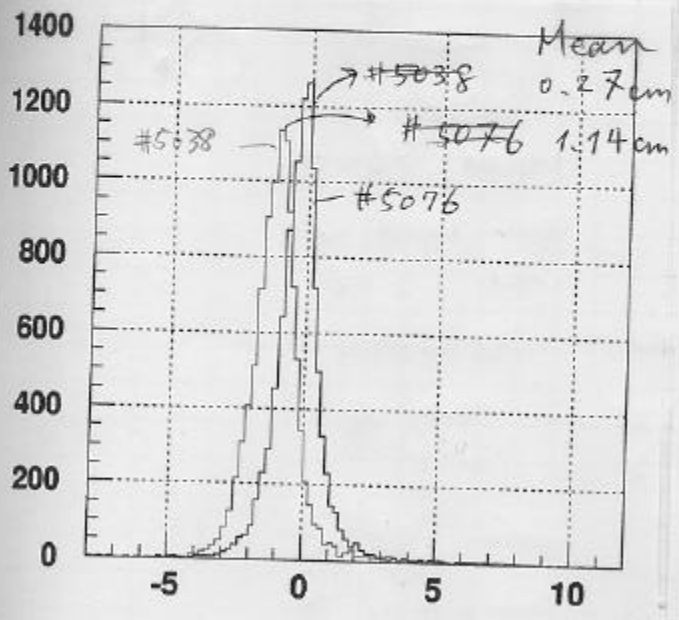
→ gamma trigger coincidence level 4

20:16 #5073 pedestal γ-beam on 273 mA
20:18 #5074 LED γ-beam on

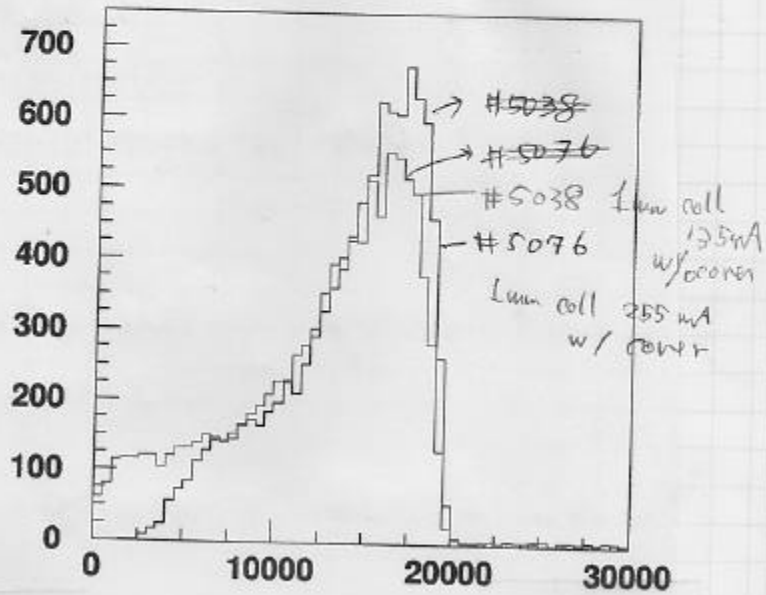
20:00 Detector shifted up by 10mm

20:27 #5075 alpha γ-beam on 262mA

20:34 #5076 γ-beam run beam 255mA
w-th window-~~cover~~ cover rate 16 Hz
50000 ~~events~~ 2nd collimator 1mmφ
(original position)



Y_AVERA



QSUM

21:40 • Detector lifted by 20 mm in total.

#5077 γ-beam run beam 188 mA.
50000 evnts rate 12 Hz

23:05 • Detector lifted by 31 mm in total

#5078 γ-beam run beam 142 mA
rate 10 Hz

00:29 #5079 γ-beam beam 112 mA
rate ~9Hz
same as #5078 but coinc. level 3
stopped @ 1907 ~~1[illegible]~~ evts

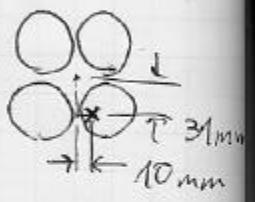
#5080 γ-beam beam 110 mA
rate ~12Hz
same as #5079 but coinc. level 2

1.40 #5081 pedestal γ-beam on
#5682 LED //

#5683. α run. //

2:50 • Detector shifted to the left by 10mm

In total { 31 mm ~~down~~ up
10 mm left



#5084 γ-beam run beam 76mA
coin. level 3
rate 9 Hz

• Detector shifted upper by 10 mm

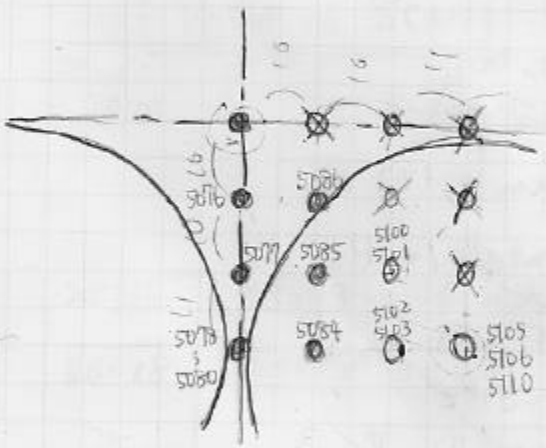
In total { 20 mm ~~down~~ up
10 mm left

4:42 #5085 γ beam run beam 58 mA
coin. level 3.
rate. 9 Hz

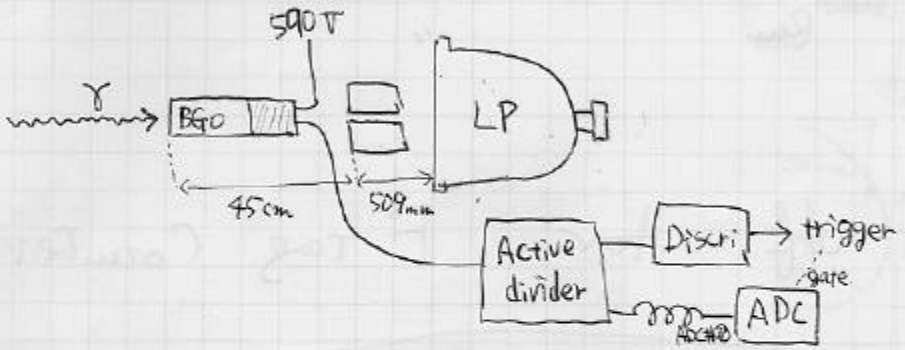
6:29 • Detector shifted upper by 10mm

In total { 10 mm ~~down~~ up
10 mm left

#5086 γ beam run beam 48 mA
coin. level 3,
rate 9Hz.



γ beam spectrum measurement with BGO



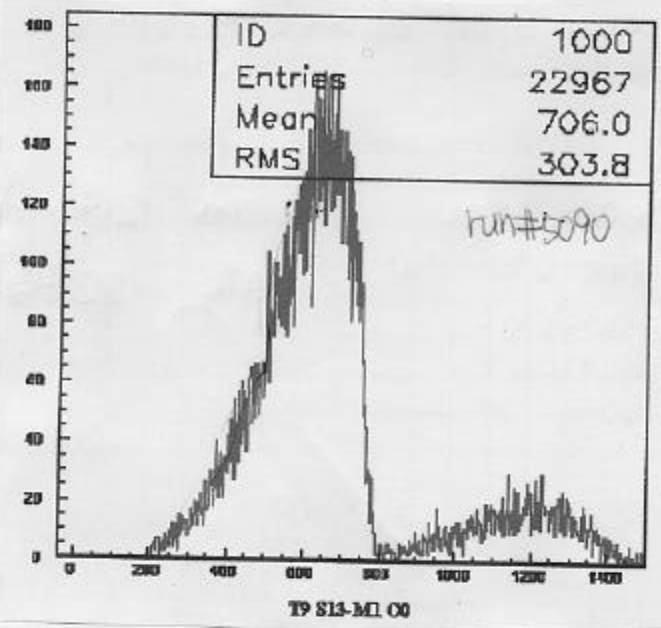
Gate width ~ 1.2 μsec

8:27 / 8:37 #5087, 5088 Gate, Pulse-height test

8:39 #5089 pedestal run for BGO } ADC#0

8:41 #5090 BGO in front of collimator (γ-trigger mode) 50,000 events

RZ file is made without calibration data.



No space to place the BGO counter behind the collimator!

Need to move the collimator!

⇨ leave it later.

8:52 #5091 same as #5090 38mA ~41,000 events

- Detector shifted to the left by 10mm, upper by 10mm.

In total { 20mm up / 20mm left

TRIGGER Setting is Returned to normal.

24/April/03

9:55 #[illegible] Pedestal Run before injection (No Beam)

9:58 #[illegible] LED Run "

HV off for E tag Counters.

12:05 New Injection ~ 239 mA.

HV turned on. all channel → 1900V

12:16 #5095 γ beam run beam 214 mA
TEST RUN DO NOT USE FOR ANALYSIS rate 22 Hz

12:25 #5096 ~~PEDESTAL~~ with γ beam on
↳ RUN COMMENT IS WRONG.
This Run is Really pedestal Run

12:37 #5097 LED with γ beam on.
STOP DUE TO HV ERROR!

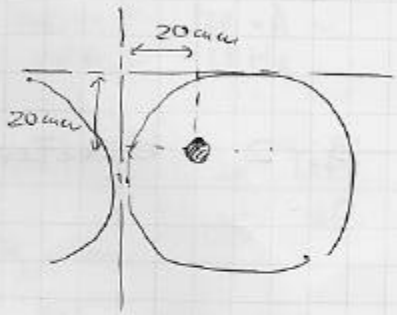
Calibration AGAIN } DO NOT USE #5095–5097 }

12:40 #5098 PEDESTAL with γ beam on

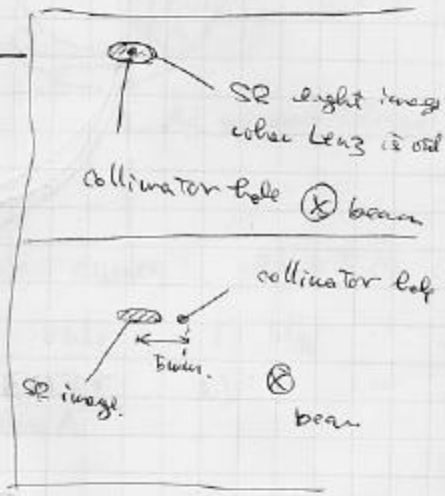
12:41 #5099 LED with γ beam on

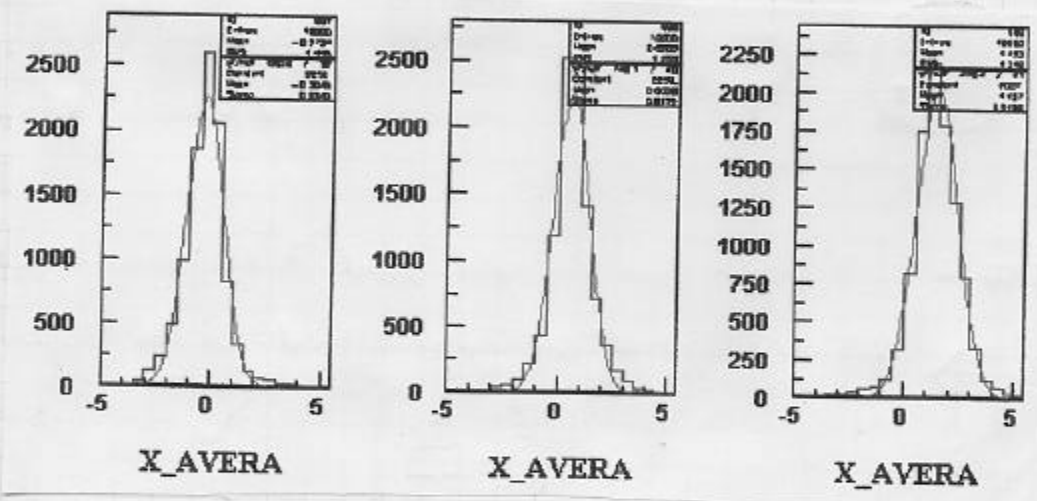
24/April/03

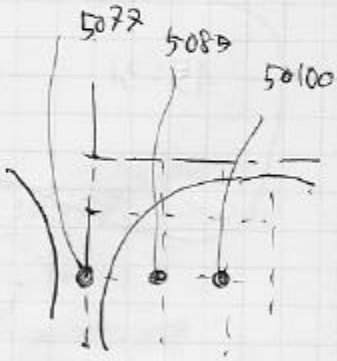
12:48 #5~~0~~100 γ beam RUN Beam 202mA
Rate 19 Hz



Note Before #5070. the 2nd collimator was moved for a Trial to install the BGO counter between the collimator and LP. It was shifted along the beam direction and returned to the normal position. In addition the horizontal position was shifted by mistake and returned to the original position. The horizontal shift was about 5 mm, which was measured by using SR-image w/o the lens. as shown in right bottom schematics.







	#5077		#5085		#50100	
Mean	-0.3048	9.0 mm →	0.6008	8.5 mm →	1.457	cm
Sigma	0.8340		0.8172		0.9466	cm

STOPPED AFTER 30000 events Acquisition!

92 26/April/03

13:16. #5101 Same as #5010.

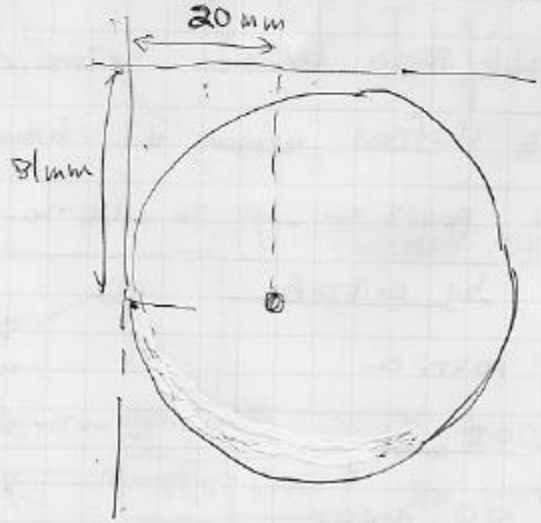
Collect. 20000 events more.

20091 events collected

13:52 Detector shifted to the up by 11mm

In total { 20 mm up left
31 mm up

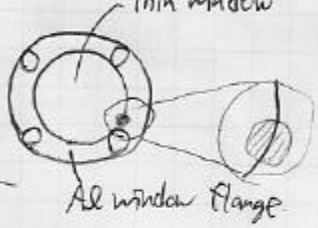
13:53 #5102 γ beam RUN



Beam 163 mA

Rate 21 Hz.

15:17 #5103 γ beam run coin. lv 3



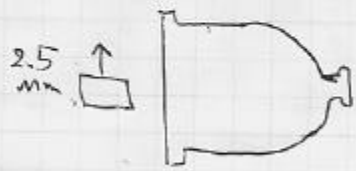
beam current 128 mA

rate 15 Hz

In total { 31 mm left
31 mm up

15:31 #5114 γ-beam run coin level 3

2.5 mm 2nd collimator moved to the left



rate ~ 10 Hz.

2764 evts

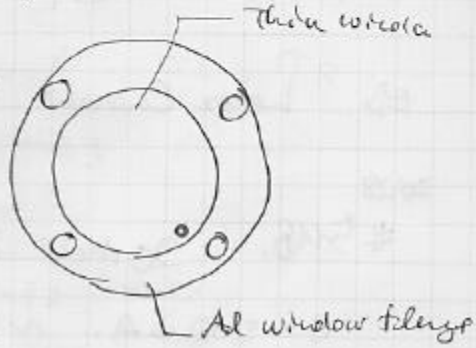
The collimator is returned to the previous position

15:42 #5105 γ-beam run coin level 3

beam current 120 nA ~
rate 15 Hz

In total { 29 mm left
31 mm up

For avoiding beam impinging on the thin window flange, the detector is shifted by 2mm to the right.



16:41 #5106 γ-beam run same as 5105
beam current 101 mA ~
rate ~13 Hz

17:49 #5107 pedestal w/ γ-beam on
beam 84mA

17:52 #5108 LED w/ γ-beam

18:00 #5109 alpha "

18:05 #5110 γ-beam beam 81mA
same as #5106 rate ~13 Hz

~~18:28~~ ~~#5111~~

Data file b/w 22/4/2003 – 23/4/2003
20MeV moved from c:¥online¥data to d:¥030407_030430
_teras3

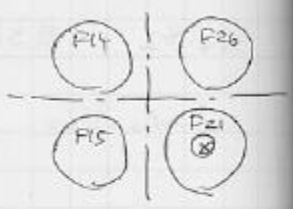
19:08 #5111 pedestal for 20MeV run beam ~~32~~ 32mA
w/ γ-beam on

#5112 LED w/ γ-beam on

#5113 ~~alpha w/ γ-beam~~ beam current is rapidly dropping
γ-beam (20MeV) ⇨stopped for new injection ~5000 cnts

#5114 20 MeV γ-Beam RUN. @ front of F21. φ1mm Coll.

e- 210 mA, ~100 Hz, Laser current: 26A



20:23.
#5115. Same as previous run.

Pile Up events increased, Laser current is too much???

20:25
#5116. 20 MeV γ-Beam RUN. Laser current down to 24A
Too Small!

20:26
#5117. 20 MeV γ-Beam RUN. Laser current Up to 25A.

⇨. Laser Current : Set to 26 A.

20:28
#5118. 20 MeV γ-Beam RUN. (Accident to in Front of F21).

e- 202 mA. ~100 Hz. Laser current: 26A, Collimator φ1mm.
Coin-level=3 50.000 events

20:45
#5119 pedestal γ beam ON } for #5118, 5121 ~ 5124
20:47 #5120 LED γ beam ON

Short Summary I

20 MeV γ RUN		TERAS current	Laser
5114	-	210 mA	26A
5115	-	—	26A
5118	50,000	202 mA	26A
5123	100,000	172 mA	"
5124	100,000	154 mA	"
5163, 5164	~200,000	35 - 37 mA	28A

20 MeV γ beam

20:54
#5121 20MeV-γ same as #5118

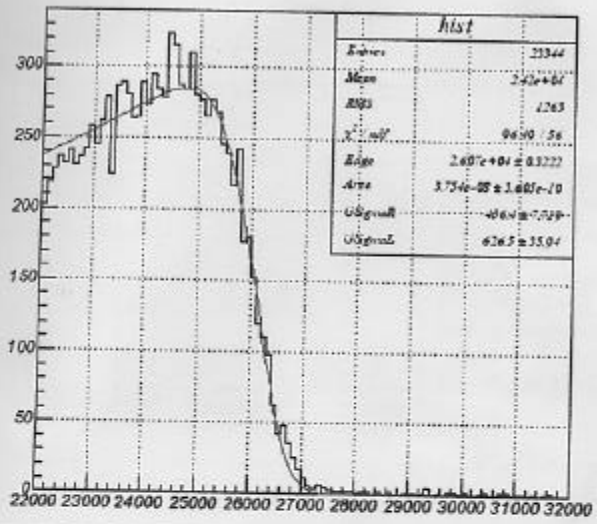
#5122 α (γ beam ON)

21:19
#5123 20 MeV-γ Same as #5118 100,000 events

e- 172 mA, ~47 Hz

21:55
#5124 same as #5123 100,000 events.
154 mA ~45 Hz

29/April/03



TRIAL of Compton-spectrum shape fitting using a convolution function of a Compton spectrum and a detector response function.

Compton spectrum is supposed from

$$N\left\{\left(E-\frac{E_c}{2}\right)^2+\frac{E_c^2}{4}\right\}$$

Detector Response function : asymmetric gaussian

FREE Fitting variables E_c, N, σ_L, σ_R.

E_c : Compton Edge Energy

N : Normalization factor.

σ_L : Gaussian σ left side

σ_R : " right side

Data. RUN 5076.

Selection Sigma2 > 45

No Correction

Result

$E_c = 26070 \pm 0.322$

$N = 3.759 \times 10^{-8}$

$\sigma_R = 456.4 \pm 9.719$

$\sigma_L = 626.5 \pm 35.94$

$\sigma_R / E_c = 1.75 \pm 0.03\ \%$

Detector shifted to Original position

23:19. #5125. pedestal run. Beam ON (20MeV)

23:22. #5126. LED calibration RUN. } γ-Beam ON.

23:29. #5127. alpha ray RUN. }

24./Apr./2003.

23:38. #5128. γ-Beam RUN. (20MeV)

Ø1mm Collimator. (0,0) incident. COIN-Lev.3.

117 mA (electron Beam current). 50000 events.

23:50 circulation stop.

25/Apr./2003.

00:08. #5129. γ-Beam RUN, same configuration as previous RUN.

e-beam: 108 mA. 50000 evts. taken.

00:37 #5130. same as before (e-current: 100 mA) 50000 events

01:09. #5131. pedestal run. Beam ON.

#5132. LED run. beam ON.

#5133. alpha run. ".

01:24 #5134. ← Failure. FAL said "NO ADC gate !!"

⇒ FAL, FASTBUS. restarted. ⇒. fixed. OK.

01:29 #5135. γ-Beam RUN. (20MeV). → 30,000 events

Ø1mm, collimator, (0,0) incident, COIN-Lev-3. electron current 81 mA

DAQ event rate ~42 Hz.

1:53 #5136 γ-beam RUN (20MeV) 50,000 events

same condition as # 5135 electron current 81 mA

DAQ event rate ~ 35 Hz

2:27 #5137 pedestal run w/o circulation.

2:29 #5138 LED run w/o circulation

2:35 #5139 alpha run

2:41. #5140. γ-Beam RUN. (20MeV). (0,0) incident. COIN-lev.3. 50000 events
electron Beam current: 72mA. DAQ event rate: ~34 Hz.

3:07 #5141 γ-Beam Run (20 MeV) same as #5140 50000 events
e Beam current: 67mA DAQ event rate ~32Hz

3:32 #5142 γ-Beam Run (20 MeV) same as #5140 50,000 events
e Beam current: 63mA DAQ event rate ~30Hz

4:00 #5143 pedestal run beam on
#5144 LED run beam on
#5145 alpha run "

4:16 #5146 γ-Beam run (20 MeV) 30000 events
(0,0) incident coin level 3.
electron beam current: 57mA DAQ event rate: ~30Hz

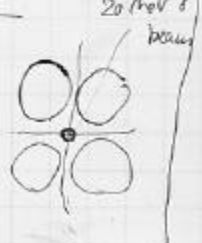
4:42 #5147 γ-Beam run (20 MeV) — 50000 events
same as #5146.
electron beam current: 54mA, DAQ event rate: ~30Hz

5:13 #5148 γ-Beam run (20 MeV) 50000 events
same as #5146
electron beam current 50mA, DAQ event rate ~30 Hz

Short SUMMARY I

20 MeV γ RUN		TERAS current	Laser
5128	50000 evt	117mA	26A
5129	50000	108mA	"
5130	50000	100mA	"
5135	30000	87mA	"
5136	50000	81mA	"
5140	50000	72mA	"
5141	50000	67mA	"
5142	50000	63mA	"

20 MeV γ RUN		TERAS current	Laser
5146	30000	57mA	26A
5147	50000	54mA	"
5148	50000	50mA	"
5152	50000	46mA	"
5153	18000	43mA	"
5154	50000	43mA	28A
5155	50000	"	28A
5159	40000	38mA	28A



98 25/Apr/2003

5:45 #5149 pedestal run (beam on)
#5150 LED run (")
#5151 alpha run (")

5:59 #5152 γ beam run (20 MeV) 50,000 events.

(0,0) incident. , coin. level 3.

electron beam current 46 mA , DAQ event rate ~ 28 Hz

6:33 #5153 γ beam run (20MeV) 6800 events. Stopped.

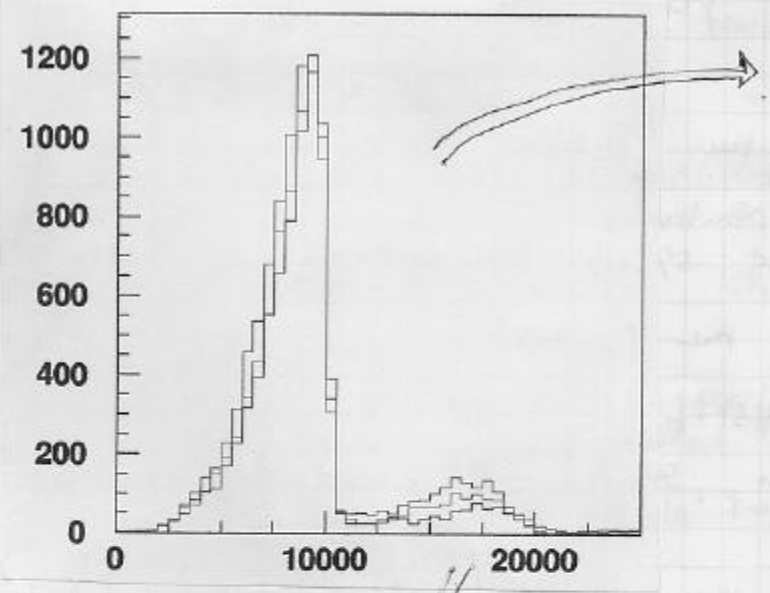
same as #5152

e- current 43mA , rate ~26Hz

6:38. #.5154. γ-beam RUN. Laser current. Up to. 28A

event rate increased up to. ~54 Hz. 50000 events.

electron current : 43 mA.



pink : #5128.
(Beam : 47mA,
Laser : 26A.
rate : ~80 Hz (@DAQ)

blue : #5140.
(Beam : 22 mA.
Laser : 26A
rate : ~34 Hz.

red : #5154.
(Beam : 43mA.
Laser : 28A
rate : ~54Hz.

Pileup events depend on Beam current.

6:58. # 5155. γ-Beam RUN. same as before.

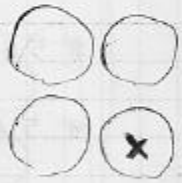
7:15 { #5156 ~~γ-beam~~ pedestal run (beam on)
#5157 LED run (")
#5158 alpha run (")

7:36 #5159 γ-beam run same as before

electron beam current 38 mA , event rate ~ 52 Hz

2:00 Stopped #5159. ~~40000 events taken.~~

Detector shifted to. { Upper 31 mm.
Left 31 mm.



8:18. #5160. pedestal run. , Beam ON

8:19. #5161. LED calibration run. beam ON.

8:27 #5162 α . beam ON

Because otherwise the beam hits the flang.

~~Detector Shifted by. 2mm.~~ initial { Upper 31 mm.
Left. 29 mm.

8:36. #5163. γ-Beam ON. (20 MeV)

electron current : 35 mA. Laser current : 28 A.
event rate (@DAQ): 30 Hz.

9:05 #5164 same as #5163 e-current: 33mA , ev-rate: 29Hz
40,443 events

~~OFF~~

9:28 #5165 pedestal . beam ON

9:29 #5166 LED

9:36 #5167 α

9:38 injection

~~FIN~~

100 25/Apr/2003

$\frac{\Delta E}{E} \propto \frac{1}{E^2}$

e-beam energy 530.6MeV

LCS energy (2nd) 9.963 MeV

Laser 1053nm

10MeV γ

→ impinging point ((-29 - 45)mm , -31mm)

10:45 10 MeV - γ available

} #5168 10 MeV - γ run test — coin. level 3, rate ~40Hz, beam 261mA

#5169 10 MeV - γ run test — laser 26A, rate ~ 30 Hz

#5170 10 MeV - γ — same as #5169 but coin. level 2, rate ~ 45Hz

beam path maybe shifted by changing e-beam energy
so, we have to move the detector to the right by 4.5mm
⇒ impinging point from #5171 (-29mm, -31mm)

11:20 #5171 pedestal w/ 10MeV-γ

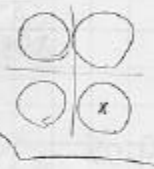
#5172 LED w/ 10 MeV - γ

#5173 alpha w/ 10 MeV - γ beam 236 mA

#5174 10 MeV - γ run beam 233 mA, rate 58 Hz, coin level 2

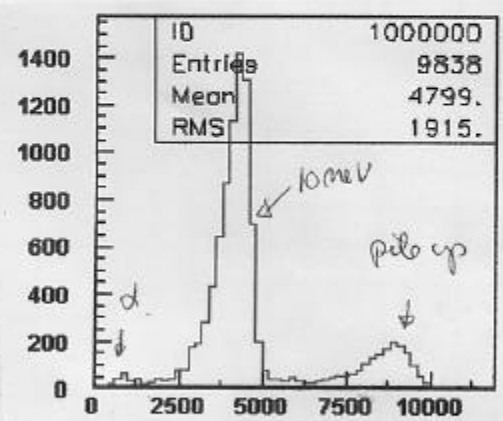
Short SUMMARY I

10 MeV TRUN		TERAS	LASER
5174	100,000	233nA	26A
5175	100,000	215nA	"
5176	100,000	199nA	"
5177	100,000	182nA	"
5178	42577	163nA	"

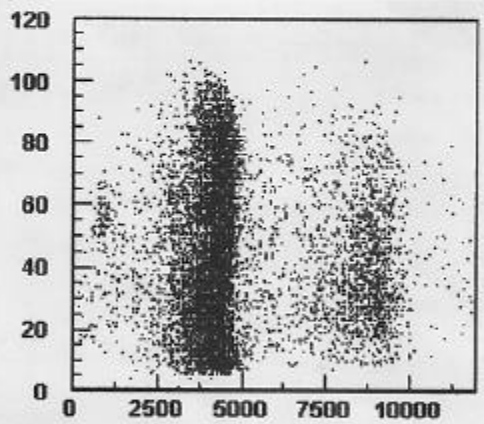


→ #5175 10MeV - γ RON beam 215 nA, rate 46 Hz, coin level 2

12:06



QSUM



SIGMA VS. QSUM

#12:38

#5176 10 MeV-γ RUN Beam 199mA

rate 95 Hz. Trigger

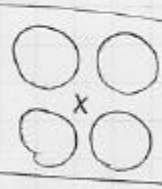
coin level 2 52 Hz accepted

13:19 #5177 10 MeV-γ run. 182mA. coin-level=2. evt-rate: 93Hz

14:07 #5178 10MeV-γ run, 163mA, coin-level: 2. event-rate: 40Hz

42577 events.

Detector shifted ~~to the left~~ to the ~~right~~ origin.



#5180 was removed.

Shot SUMMARY II

10 MeV γ RUN		TEBAS	LASER	
5183	100,000	143mA	26A	
5184	100,000	125mA	26A	
5189	100,000	110mA	26A	*
5186	100,000	98mA	26A	*

* coincidence level 3

14:49 #5179 pedestal, beam ON

14:52 #5181 LED, beam ON

15:02 #5182 α, beam ON

15:07 #5183 10MeV-γ run, 143mA. coin-level (2). event-rate: 40Hz

100,000 events.

16:05 #5184 same as #5183, 125mA, event-rate: 41Hz, 100,000 events

17:11 #5185 10MeV-γ run. 110mA, coin-level (3). event-rate: 29Hz

18:13 #5186 same as #5185. 98mA. 23Hz

gamma beam → 40 MeV. Injection, beam path shifted. detector was moved to left of 6.5mm

20:11 #5187 40 MeV-γ-run 219 mA coin-level (3) event-rate 22 Hz

100000 events collected

~~21:09 #5188 Pedestal~~

~~#5189 Laser Shutter Closed~~

~~output 35mA 2.22mA~~

~~Laser Beam off~~

40 MeV from RUN 5187

25/Apr/2003

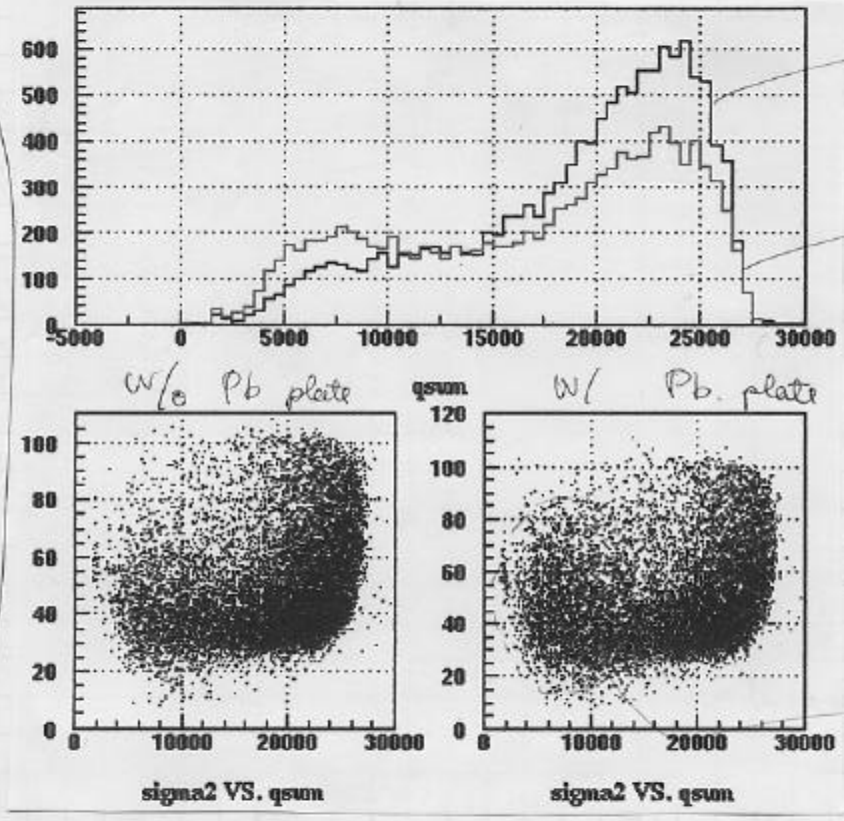
21:47 #5188 Pedestal beam ON

22:04 #5189 LED beam ON

Effect of material - comparison of

#5065 : with Pb plate, γ coincidence ON

#5066 : without Pb plate γ coincidence ON



As shown in p 85 by MC effect of material appears in lower energy side (~10MeV) with small sigma2.

Interaction events

Laser Shutter Closed

22:13 #5190 Laser current 35 mA → 27 mA. Laser Gate off

SR run. γ coincidence level 3

TRIGGER RATE 165.3 Hz, TERAS 150 mA

DAQ RATE 70 Hz 50000 events

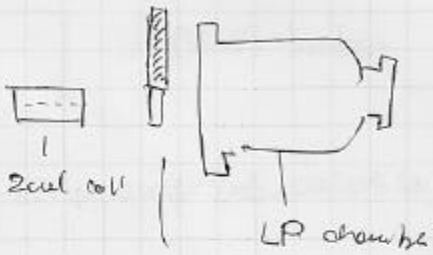
22:26 #5191 SR RUN same as #5190

TRIGGER RATE 165. Hz TERAS 146 mA

DAQ RATE 54 Hz 50000 events

Charged Veto counter Installed 25 (April (03

HV + 3000 V applied



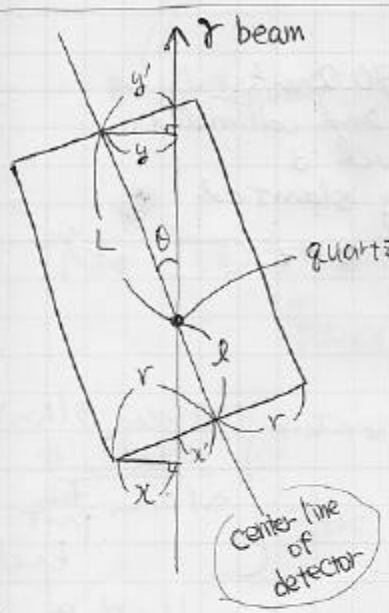
Veto. Counter

22:53. #5192 Charged Veto TEST RUN

Charged Veto Signal is read out by this the cable for TC1 lower counter.

ADC online histo ID (229

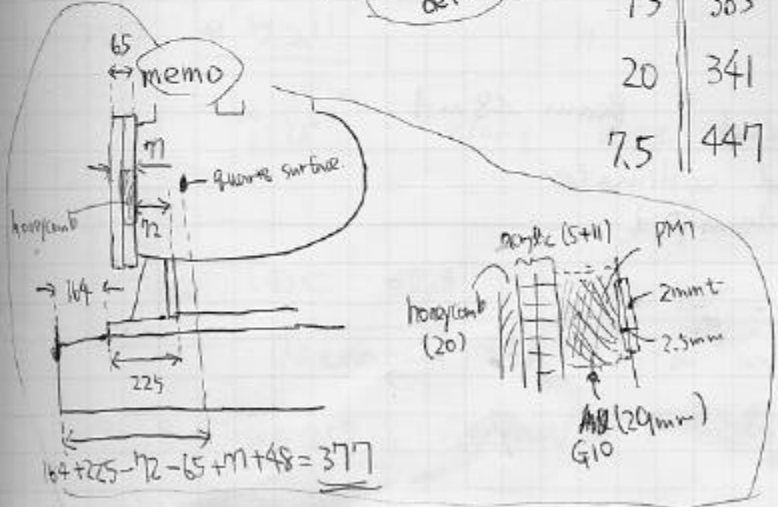
Normal γ - trigger , coincidence level 3



$$\begin{cases} L + l = 1500\ [\text{mm}] \\ L = 1123 \\ l = 377 \\ r = 500 \end{cases}$$

$$\begin{cases} x = r\cos\theta - l\sin\theta \\ x' = l\tan\theta \\ y = L\sin\theta \\ y' = L\tan\theta \end{cases}$$

θ	x	x'	y	y'
5	465	33.0	929	98.2
10	427	66.5	195	198.
15	385	101	291	301
20	341	137	384	409
7.5	447	49.6	147	148



104 Apr. 26 '03

00:34 # 5193 40MeV-γ run
50000 evts

beam ~ 100mA 763 MeV
· 1mmφ 2nd collimator
· coin. level 3
· 15 deg slanted

01:51 # 5194 pedestal beam 81mA
5195 LED
5196 alpha beam 81mA

2:30 Detector slant angle 7.5°

02:49 # 5197 pedestal beam 72mA
5198 LED
5199 alpha

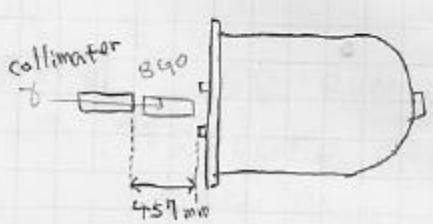
5200 40MeV-γ run
· beam 70.2 mA
· 1mmφ 2nd collimator
· coin level 3
· 7.5 deg slanted
· rate ~ 9Hz

05:17 # 5201 pedestal
05:20 # 5202 LED

5:40 start cooling Xe tank

Detector 90 deg slanted
~10cm ~~for~~ put ~~back~~ backwards

5203 α
5204 Test for BGO
5205 pedestal for BGO.
5206 BGO which is placed after 2nd collimator (1mmφ) Beam 48mA



26/Apr./2003.

High Gain RUN → TDC(slot5) broken

06:15
HV configuration [redacted].file [redacted] ···· hvdata-11-Apr-2003/5e6_022204.hv
loaded.

HV error!!. (#HV 13-4).

6:26 #5207 pedestal w/ 40MeV-γ → w/o attenuator for central 4 PMTs
#5208 LED w/ 40MeV-γ

LED HV set {187, 89, 91, 93, 96, 98}
⇒ FAL modified.

#5209 40MeV γ w/ gain 5×10^6
- beam 46 mA
- 1mmϕ 2nd collimator
- rate ~8HZ.

▶ Attenuator plugged. ⇒ F14, F15, F20, F21. (-10dB).

No TDC data in TDC #64 – #128 (slot 5 of FB)
RUN STOPPED

7:03 #5210
TDC TEST RUN

7:07 #5211 "

7:25 start move xenon 47 l tank to 250 l tank (20 atm)

The TDC slot is changed from 5 to 4.!
Recompile FAL after modifying the code.

7:08 #5212. 40 MeV γ high gain after changing the TDC SLOT

106 26(April)03

No ! the problem could not be fixed
even after changing the slot.
What we did in this Trouble shooting.

- SWAP the start signals between modules in slots 5 & 6

⇨ SLOT 6 data ok
5 data NG

⇨ start signals fine

- SWAP the signal cables between modules in slots 5 & 6
(the first 0 - 15 channels)

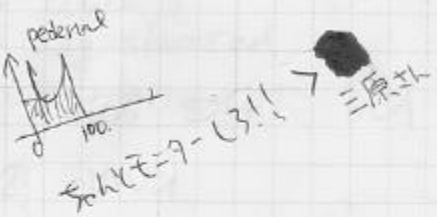
⇨ SLOT 6 data OK
5 data NG

This problem must be caused by the module
in slot 5, which is now
installed in the slot 4.

We decided to continue DAQ in this situation,...
To collect sufficient (?) amount of high gain data

stop ~~#5211~~ 5212 26027 events

8:00 #5213 pedestal ← ADC #160



8:05 #5214 LED

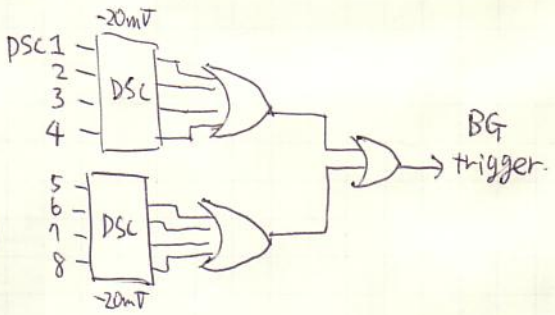
8:13 #5215 α 100000 events

8:30 start recovery

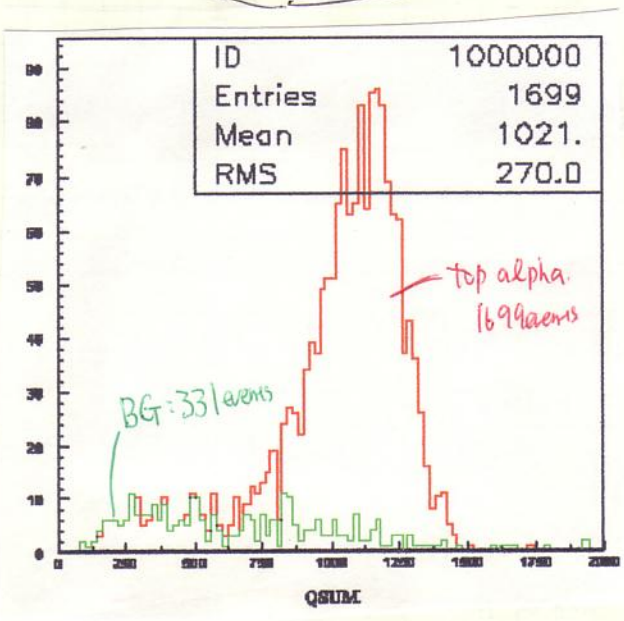
ET1~4 threshold.

ET1	-30mV
2	-30
3	-30
4	-300 mV ???

10:02 minicard for ADC#160 changed



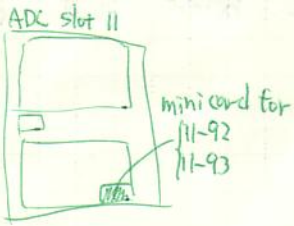
#5216 pedestal
#5217 LED
#5218 BG measurement (See right.)
~3%: BG
~97%: α
500,000 events



② got rid of attenuators on F14,15,20,21. (-10dB)

#5219 12:52 pedestal
#5220 12:53 LED
#5221 13:00 BG meas. (DSC 1~8) COIN LEVEL=1
500,000 events.

NO signals
ADC 159
ADC 160
NOT fixed



- mini-card NOT broken
- ADC inputs are normal
- active divider is normal

I can't guess the reason...
See P110.

#5222 16:09 pedestal
#5223 16:11 LED
#5224 16:30 BG meas. (DSC 1~4) COINLEVEL=2
500,000events.

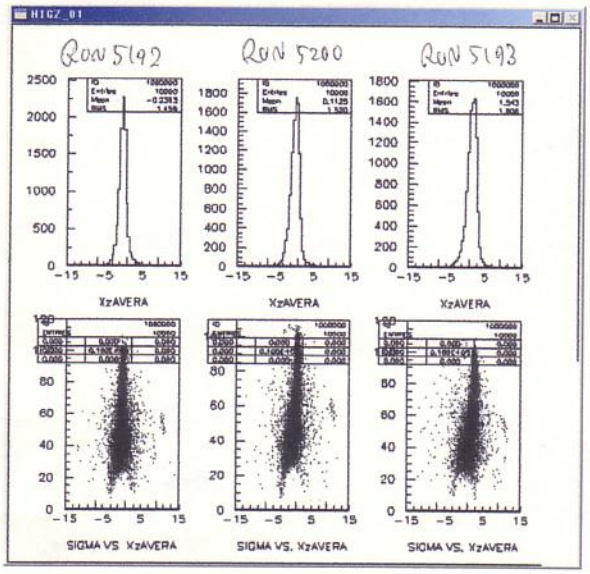
#5219~#5228
every data is unstable.

CANNOT CALIBRATE!!

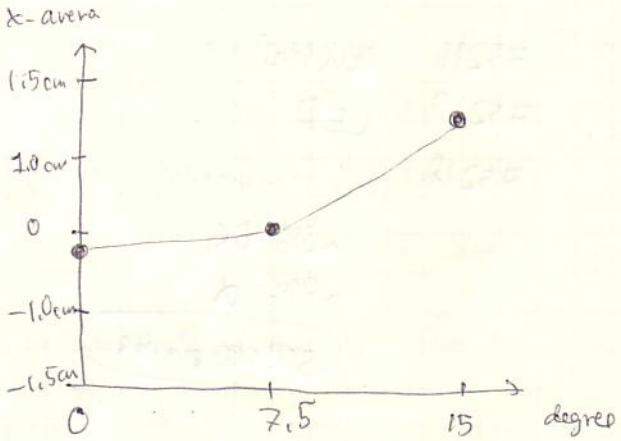
#5225 18:00 pedestal
#5226 18:01 LED
#5227 18:14 BG meas. (DSC 1~8), COIN-LEVEL=1, 30000 events
#5228 18:28 BG meas. (DSC 1~8), COIN=1, 51000 events

26 (April (03 ◎ Short Summary of incident angle scan.

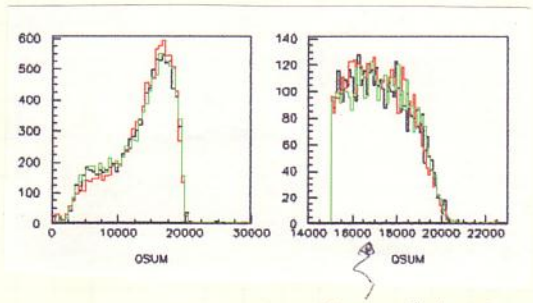
X-AVERAGE.



correlation between Sigma and x-average. for large incident angle



	0°	7.5°	15° incident.
Mean	-0.2393	0.1125	1.543
RMS	1.459	1.520	1.606



Expanded spectra around the Compton peaks.

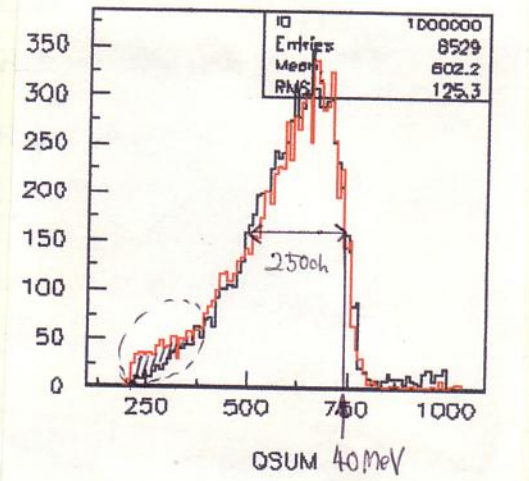
No change in the energy spectrum as shown in the bottom figures.

black 15° incident

Red 7.5° incident

GREEN Normal (0°) incident

◎ BGO data before and after the collimator



black RUN 5090

Red RUN 5206

To adjust the peak position 5206 data was multiplied by (30/635 + 1).

No big difference. ← of gamma with the collimator.

The shaded part is probably due to interaction

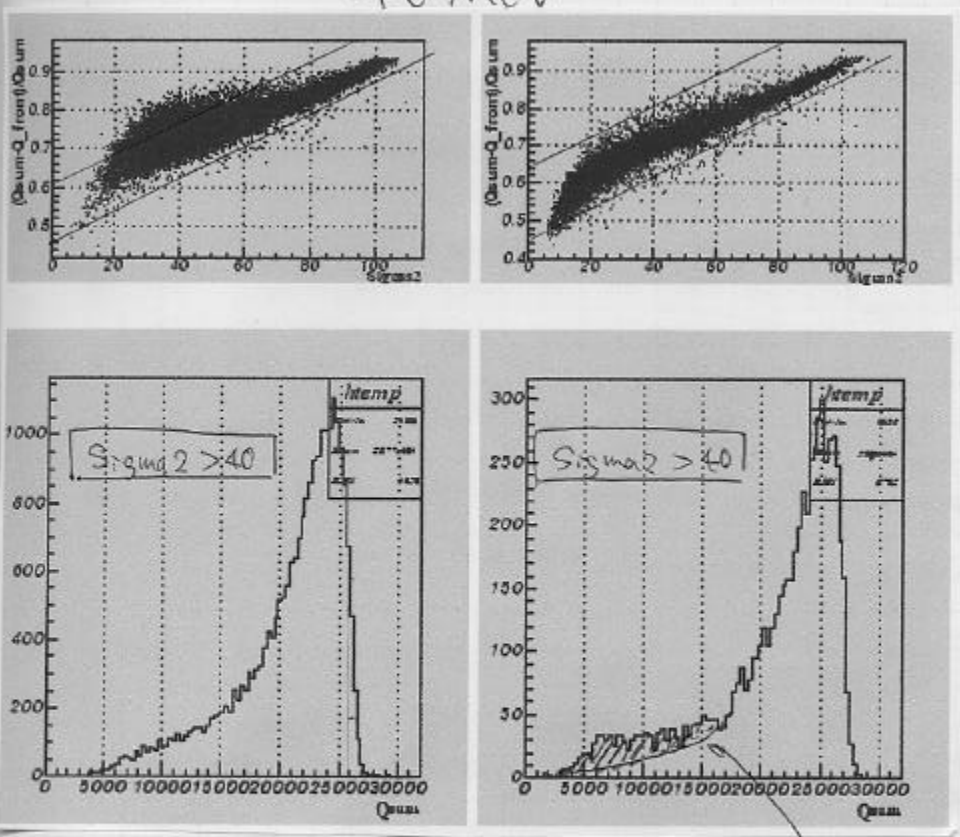
FWHM ≃ $40 \times \frac{250}{750} = 27$ MeV

The size of the BGO CRYSTAL

Diameter ~55mm × Length ~175mm

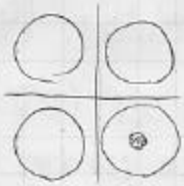
40 MeV

26/April/03



RUN 5076
TERAS 255mA

RUN 5110
TERAS 81mA



FWHM ~ 9 MeV

- Spectrum shape of 40 MeV γ.

Events with less amount of light in the front face are discarded using a relation between $\left(\frac{Qsum - Q_{front}}{Qsum}\right)$ & Sigma2.

After this selection, the applying spectrum shape is consistent with BGO spectrum, which seems to be a realistic Compton's spectrum, compared to those on P87.

probably, this is caused by γ interaction with xenon in the PMT holder.

⚠ Shift of the peak position is most probably due to the huge TERAS current in RUN 5076.

& Connection for ET3 ET4 were swapped @ Burndy connector!

	CAMAC FDC CH	ADC CH
ET1	13	235
ET2	14	236
ET3	15	238
ET4	16	237

22/Apr./03.

10:30. HV error. @HV1-6. Error occured again & again.

⇒ HV1-6. set to 0 V.

27/Apr/2003

Pedestal check

ADC#	ADC-ch	description			
11	13-12	RMS~3			
99	11-4	Mean~409	→ mini card changed	→ Mean~87	OK
112	11-17	RMS~65	→ mini card changed	→ RMS~1.0	OK
163	11-96	Mean~453	→ mini card changed	→ Mean~89	OK
164	9-1	Mean~453	--- can't be fixed.		

active
may be in trouble with divider.

ADBC (slot 11)

one of PS cable for burst guard was off from the ADC board. → fixed ok

⇧ ADC# 159. 160 recovered. (see P.107)

~~dark test~~ α run test in liquid/gaseous Xe.

17:05 #5229 pedestal

17:09 #5230 LED

@ ADC 61, 120, 140 have no data.

127, ~~126~~ 119

- ADC #61 has too much current. (90μA for 200T)
  (L4)
  ⇒ HV off (0T)
- ADC #119 (BT19) has much current (167μA for 900T) ⇒ HV off
- ADC# 140 : burndy pin ~~was~~ unreceptacle unplugged.

- ADC # 120, 127 are ??? not fixed.

HV file for gain of 5×10^6 loaded.
saved as "5e6_030427.hv".

HV error

Address	HV ch
BT19	7-5
L2	0-10
L4	1-6
BT29	8-9
R7	1-8
R10	2-4
R11	3-8
F10	16-7
F23	18-4
F12	17-6

⇒ Disabled. (0V)

GXe alpha run

HL up −94.22°C
HL low −95.67°C

→ USE #5231 and #5238 set

19:03 #5231 pedestal → 5×10⁶ gain setting.
19:05 #5232 LED run T23, BT32 } have no signal.

X #5233 α run (NIM threshold = −20 mV all) 50mV/PMT
too low threshold → 0 over 1PMT hit

19:19 #5234 α run (NIM thre = −120 mV all)
100,000 events

19:37 #5235 α run (NIM thre = −75 mV all)
~~30~~ 50,000 events --- pedestal shift ??

19:42 #5236 α run same as #5235
100,000 events.

HL up −93.63°C
HL low −94.98°C

0.182MPa ~ 0.183MPa
See data of

19:59 #5237 pedestal

20:01 #5238 LED run {87, 88, 89, 90, 91, 92, 93, 94, 96, 98} 10 step

HV off.

DATA storage for TERAS-3.

raw data
KEK @ Linux pstmp12.kek.jp:/scratch3/muegamma/030407_030428_teras3/
KEK @ Win2k pstmp17.kek.jp: D:\030407_030428_teras3\
ICEPP @ Linux boss.icepp.s.u-tokyo.ac.jp:/scratch/muegamma/030407_030428_teras3/

*.rz, *.par, *.dat, *.ps
KEK @ Linux pstmp12.kek.jp:/scratch1/muegamma/030407_030428_teras3/
*.par, *.dat, *.ps
ICEPP @ Linux boss.icepp.s.u-tokyo.ac.jp:/scratch/muegamma/030407_030428_teras3/pars/

3:45 recovery finish LN_2 consumption ~ 1250 ℓ
start evacuation

4:05 stop evacuation inner vessel 2.2×10 Pa

8:38 Refrigerator cooling power check. by T. H.

- $P_{inner} = 5.4 \times 10^{1}$ Pa
- Rotary Pump ON.

• Cold head ⇒ Air Cooled (Fan)

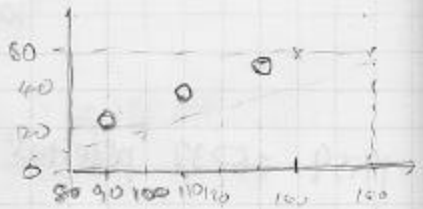
8:45 - Gate valve open → 4.0×10^{1} Pa.
8:50 1.8×10^{1} Pa
9:00 6.3×10^{0} Pa.

~~1 Torr~~ 1 Pa ≈ 7×10^{-3} Torr.

- Water Chiller ON
- Ref. Comp ~~ON~~.

Initial.
Set point 167.4 K

9:06 Comp ON 16.2 kg/cm² / 3122.8 h.
$T_c = 243.5$ K.



9:12 $T_c = 190.6$ K $P_{in} = 4.0 \times 10^{0}$ Pa.
9:20 $T_c = 139.5$ K $P_{in} = 3.5$ Pa
9:25 Tset 120K. / $T_c = 109$ K) Control Start. ≈ R = 135 Ω. ~~77~~ 72.5 W Max.
9:29 Tset = ~~110K~~

10:00 Tset = 110K $P_{in} = 2.9$ Pa P_{comp} 19.1 kg/cm² $P_{chiller}$ $T_{chiller} = 20.0$°C
$T_c = 110.02$ K
Qheater = 55-56% (~40 W)

~~Tset = 90K~~

10:24 Tset = 90K $P_{in} = 2.8$ Pa
$T_c = 90.0$
Qheater = 35% (~25 W)

Tset = 130K

10:48 Tset = 130K $P_{in} = 2.9$ Pa
$T_c = 130.1$ K
Qheater = 75% (~50 W)

~~Comp off~~ /