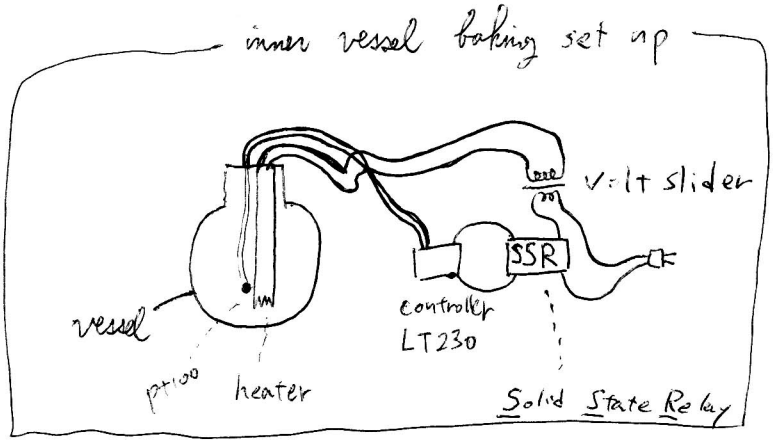
~~[redacted]~~ 08/Feb. Transportation. KEK → AIST

~~0:25 → HV off. Turbo Pumps Turned off~~

0:25 inner vessel 6.4×10^{-2} Pa



inner vessel baking start SV = 40°C
~~Slidac~~ 10V (Volt slider)

1:00. ~~He~~ leak test @ Outer Vacuum Vessel.

Leak rate $\lesssim 2 \times 10^{-9}$ mbar·ℓ/sec. OK.

1:20 inner vessel baking off

09/Feb. (Sat.)

10:50 Inner vessel : 3.7×10^{-2} Pa.

11:10 Outer vessel : 2.2×10^{-3} Pa.

11:30 Purification line: 1.6×10^{-4} Pa.

Helium leak check.

- Inner vessel.
- Purification line. $\lesssim 1.2 \times 10^{-8}$ mbar·ℓ/sec. OK.

9/Feb

IP address @ AIST

DAQ: 150.29.207.119 00:40:26:fb:ba:e7

HV: 150.29.206.180 — LRS1454 (smaller, upper)

150.29.206.128 — LRS1458 (larger, lower)

41043 青木さん

DNS: 150.29.192.128

192.31.200.150

SNM: 255.255.254.0

GW: 150.29.206.1

19:00 inner vessel filled with GN2 (1.1atm) to test Sig and HV.

21:00~ dark current check (HV = 1000V typ.)

G10	ADC	adrs	@ ADC input	other test	where to be fixed
1-7	12-7	R2	double pulse, 30nsec, noise, dark current	open @ divider input	f.t. ↔ divider
2-29	12-61	T4		ok @ divider input	divider ↔ ADC
4-10	11-10	L23	open (∞Ω)	ok @ burndy receptacle	burndy ↔ ADC
6-12	11-92	BT32		f.t. pin is (bented)	f.t. pin
5-14	11-62	F1	open (∞Ω)	ok @ burndy receptacle	burndy ↔ ADC
8-12	9-60	BR1	triple pulse	open @ burndy receptacle, ok @ f.t. (100kΩ)	f.t. ↔ burndy

f.t. ≡ feed through

HV off

10/Feb

2:00~ inner vessel evacuating (re) start.

13:00 inner vessel baking start (SV ~~TC~~ = 40°C volt slider 18V)

13:50 inner vessel ~~40×~~ 5.2×10^{-2} Pa

10/Feb.

11:20. Outer Vessel : 4.6×10^{-3} Pa.
Inner Vessel : 6.7×10^{-2} Pa.
Purification line : 2.1×10^{-4} Pa.

14:30 Xe line flexible tube baking start @ 45V
14:50 filled inner vessel with GN_2 to test gain calibration system.
15:00 inner vessel baking → 30V

15:25 TURNED ON HV for ALL PMTs

16:45 Noisy signal appearing during the pressure & temperature scanning, even with a few tenth mV peak-to-peak- amplitude. The scanner is thus embedded in an Aluminum cage so as to reduce such a source of noise.
The max. amplitude is now ~ 3mV.

17:05 Run # 2081 pedestal

18:00 start of LED calibrations.

We decide to ~~fire~~ flash only two LED's at a time. The paired LED's are those placed on opposite detector faces, facing towards each other. We found that {38, ..., 42V} is the set of HV LED supply ~~set~~ values which fits the ADC range all over the channels. We changed the on-line accordingly.

18:00	Run #2083 started	LED 1+5	5000 events	(1000 for each LED settings)
18:05	Run #2084	~~LED~~ LED 1+5	" "	"
18:15	Run # 2085	LED 2+6	" "	"
18:20	Run #2086	LED 3+7	" "	"
18:25	Run # 2087	LED 4+8		

18:40 One more bad channel found:

address BK24 , ADC ch. 199 G10 8-4

~~Both ADC~~ The signal looks like missing a ground reference, both at ADC input and at the burndy output. After inspection of feedthroughs, the ~~pin~~ corresponding pin is found bent. ~~After soldering~~ FIXED.

19:00 HV turned OFF

11/02/2001

11:00 Inner chamber = 4.9×10^{-2} Pa (w/ baking inside chamber)

Outer " 3.2×10^{-3} Pa

Purification line: 8.6×10^{-5} Pa (w/ baking)

14:50 Start to fill ~~the~~ vessel with GN_2 ⇒ 18:35

Evacuation restarted.

15:04 ~~PMT~~ PMT's turned ON.

Before starting measurements we lowered some HV of too high gain PMTS:

F12	ADCCH	143	FROM	1027	→ 950
T31	"	153	"	974	→ 850
BK18	"	201	"	986	→ 850
BK13	"	222	"	943	→ 850

15:17 Token RUN 2088 PEDESTAL 2088 PED

15:19 RUN 2089. LED RUN 5000 events (LED 1&5) 2089

15:24 2090 " " " " 2090 CRASHED

We take LED data each 5 minutes to see the long term stability

15:29 HV FAILURE SCFE exited abnormally.
HV reset.

15:30	#2091	PEDESTAL	2091 PED
15:30	#2092	LED 1&5 run for LONG TERM	2092
15:35	#2093	LED 1&5 run for LONG TERM Stability test	2093
15:40	#2094		2094
15:45	#2095	~~(modified SCFE to auto restart every 5 minutes)~~	2095
15:53	#2096	@ 100 Hz (runs 2096–2112)	2096
15:55	#2097		2097
16:00	#2098		
16:06	#2099		
16:10	#2100		
16:15	#2101		
16:20	#2102		
16:25	#2103		
16:30	#2104		
16:36	#2105		
16:40	#2106		
16:45	#2107		
16:50	#2108		
16:55	#2109		
17:00	#2110		
17:05	#2111		
17:10	#2112		
17:12	#2113	same but @ 10 Hz to check if LED is stable at 100 Hz	

17:30	Run 2114	LED 1 & 5	10000 events per bin	
17:40	2115	PEDESTAL		
17:42	2116	LED 1 & 5	10000 events per bin	
17:55	2117	LED 2 & 6	10000 events per bin	
18:05	2118	LED 3 & 7	" " " "	
18:20	2119	LED 4 & 8	" " " "	
18:30	2120	FAKE RUN NOT USE		
18:30	2121	PEDESTAL		

12/02/2002

11:45	Inner vessel w/ baking	4.8×10^{-2} Pa
	Outer vessel	3.1×10^{-2} Pa
13:15	Purification	5.6×10^{-5} Pa

17:25 During the check of the stability of the gains we decided to lower the HV of Those PMT's:

AdC Ch	PMT	NEW HV
157	T-32	850
168	T-33	1050
173	T-24	900
172	L-24	900
169	L-33	900

... Other channels with minor adjustment

NOTE ON HV ⟷ ADC CORRESPONDENCE

The HV⟷ADC correspondence has been checked to be Ok (some swapped channels fixed) on 5, feb by SR & GS & DN

After the check THREE channels are not responding:

L5 BT32 F1

NOTE: MINICRD OF #160 11-93 & #159 11-92 (SAME) Should be replaced.

21:00 inner vessel taking off

9:50 2.0×10^{-2} Pa Inner Vessel

LIST OF BAD ADC Channels / PMT

	ADC ch.	address	symptom	possible cause
△	6 (12-7)	R2	ADC non-linearity (jump in the ADC value at ~512 counts)	two different ramps?
○	5 (12-6)	T2	beats in bin-to-bin contents of ADC distribution, with 4 counts period	noise on bit #2
X	45 (12-46)	L5	no signal at the ADC input	
X	105 (11-11)	L28	no signal at the ADC input, seen at the burndy	broken cable ?
X	129 (11-62)	F1	see L28	
Y	159 (11-92)	BT32	very noisy, just like its companion ch #160	mini-card broken
○	172 (9-9)	L24	unstable high gain,	HV unstable ?
Y SEEMS OK	109 (11-14)	L27	slight non-linearity at the low ADC range	

22:00 MINICARDS REPLACED (WO)

for ADC ch 6, 5, 159, 109

↓ NG ↓ OK ↓ NG saturated ↘ NG (still non-linear)

14/2/2002

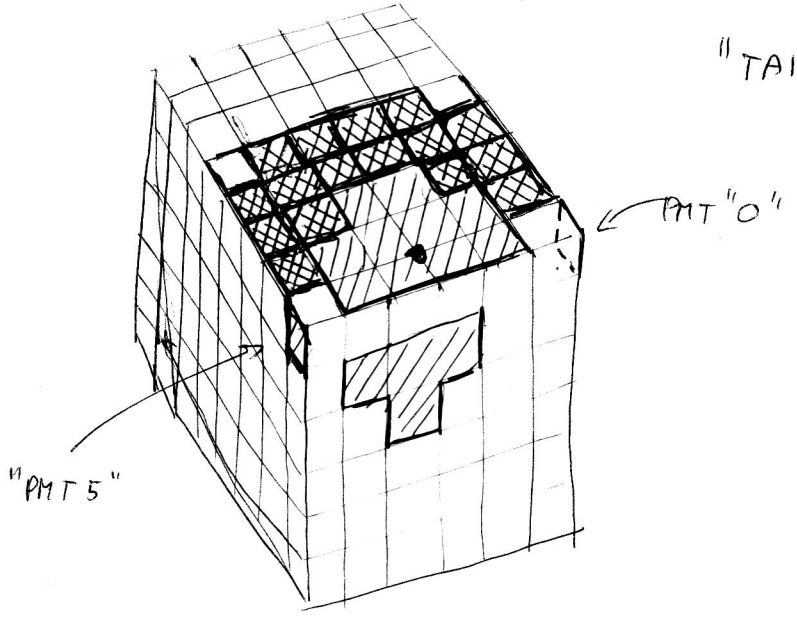
8:45 RE-ARRANGMENT OF DISCRIMINATORS CHANNELS.

To better trigger on α-sources (and also on γ-rays) we chose to swap some channels. There are now two kind of DISCRIMINATOR modules, namely FORWARD module and TAIL module, each for any lateral face: RIGHT-FORWARD board, RIGHT-TAIL BOARD, TOP-FORWARD, TOP TAIL etc.

The meaning is the following:

"FORWARD" BOARD contains RED channels

"TAIL" BOARD CONTAINS BLACK CHANNELS



The boards are in the following order (on the camac crate)

	FORWARD				TAIL			
	R	T	L	BT	R	T	L	BT
	N2	N4	N6	N8	N10	N12	N14	N16
1	FRONT FACE PMT IN INCREASING NUMBER							
2								
3								
4								
5								
6								
7								
8								
9	FACE PMT IN INCREASING N. (1,2,3,4,7,8,9,10,14,15)				FACE PMT IN INCREASING NUMBERING			
10								
11								
12								
13								
14								
15	PMT 0							
16	PMT 5							

10:50. Inner Vessel : 3.8×10^{-2} Pa.

11:12 Outer Vesel : 2.3×10^{-3} Pa

11:35 purification line : 2.0×10^{-4} Pa

Outgas test

11:54 start (gate valve closed)

t = 0 4×10^{-2} Pa

20 s 7.5 "
30 s 8.6 "
40 s 9.6 "
60 s 11.8 "
70 s 13.6 $\times 10^{-2}$ Pa

Pirani gauge is monitored hereafter with data logger

7hr 30min ~10 Pa

14:15 outgas test stopped

15:05 Inner vessel 5×10^{-2}

~~14:20~~ Start to fill Xe gas ~~[illegible]~~ (with) for precooling.

15:40 ~~[illegible]~~ LProto filled with Xe gas at 1 atm (absolute).

PMT's turned ON.

flow meter 0 ⟶ 5244

16:10 HV channel 0-0 (R3) tripping even at low voltages.

Bleeder resistance = 2.2 KΩ (instead of 14 MΩ !).

Bad channels

R3,
BT38
L28
F1

T2 5 ok	T3 12 ok	T8 9 ok	T9 0 ok
R2 6	~~R5~~	R8 10	R9 3
L2 4	L3 13	L8 8	L9 1
BT2 7	BT3 14	BT8 11	BT9 2

flow meter value

16:40 Xe: 1.4 atm & test injection finished (6863) 223

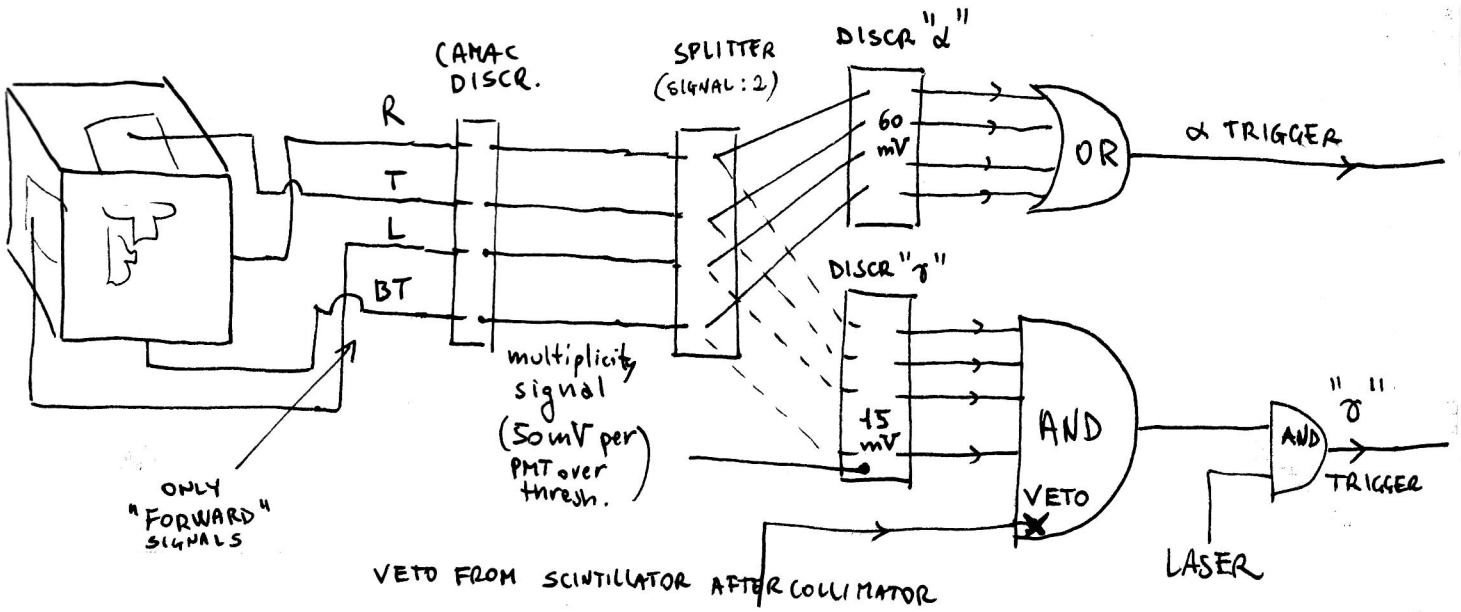
After switching on PMT several bad PMT:
THOSE PMT WERE SWITCHED OFF!!

R11: Chaintrip	F2	BT38
R3 (Rint=1.8 kΩ)	F1	F29
F34	L28	

22:35 HV values increased to T2, T3, T8, T9 respectively 1050, 980, 1035, 1050 V
so as trigger events with α's in Xe.
Multiplicity threshold set to 3 PMT's;
Xe pressure: 1,4 atm.

22:36
2122 pedestal run (HV dg1.hv)
2123 α run (TRY)
(ADJUSTED HV FOR T2, T3, T8, T9) AGAIN
2124 pedestal run
2125 ~20000 α's. Gains of PMT\{T2,T3,T8,T9} = 1E6, {T2 T9} ≅ 5×10^6
2126 LED 125 flashed for PMT calibrations
2127 ~11600 α's
00:09

TRIGGER SCHEMATICS FOR "α" & "γ"



0:34 Add Xe gas up to ~~g~~. 1.96 atm

flowmeter 10023

0:39

0:43 refrigerater ON.

started precooling comp. press 20.5 $T_c = 165.0$ K

holder upper temp.	26.7	°C
" lower "	27.7	°C
surf Meter top	22.7	
mid	23.0	
Bott	24.4	
Heater front	26.9	

15/02/2002

17:50 Data directory on DAQPC changed to E:¥online¥data

because ~~di~~ [redacted]

disk C is almost full

19:30.

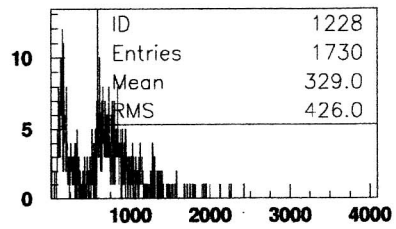
Trigger Counter Set Up is Completed !!

《HV set. for Trigger Counter.》

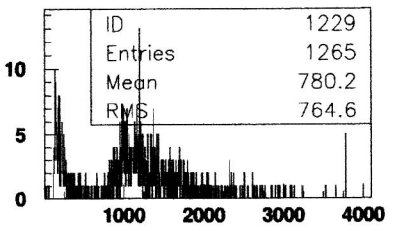
- TC1. (Upper ··· −2000 V. / Lower ··· −1600 V.
- TC2. (Upper ··· −1800 V / Lower ··· −1800 V
- TC3. (Upper ··· −2070 V. / Lower ··· −1850 V.

Trigger Logic is same as Nov./2001 Cosmic Ray Run.

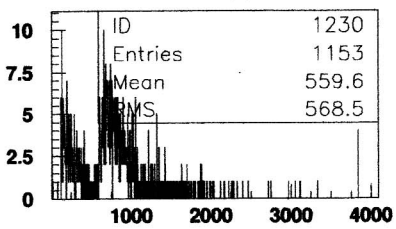
ADC spectrum is shown in next page ⇒.



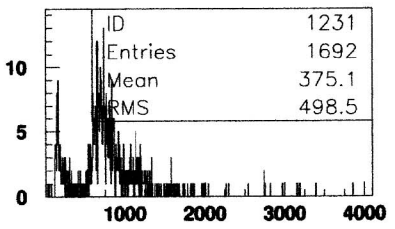
TC1 Upper



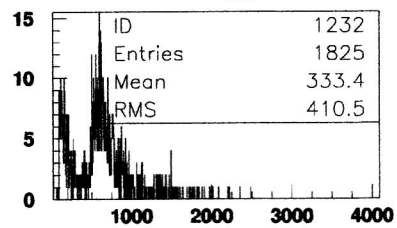
TC1 Lower



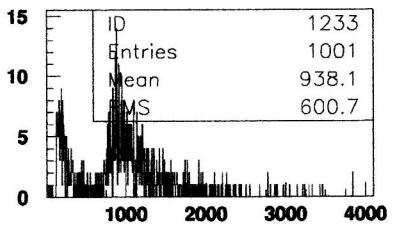
TC2 Upper



TC2 Lower

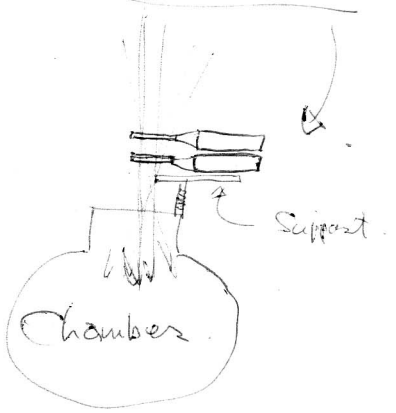


TC3 Upper



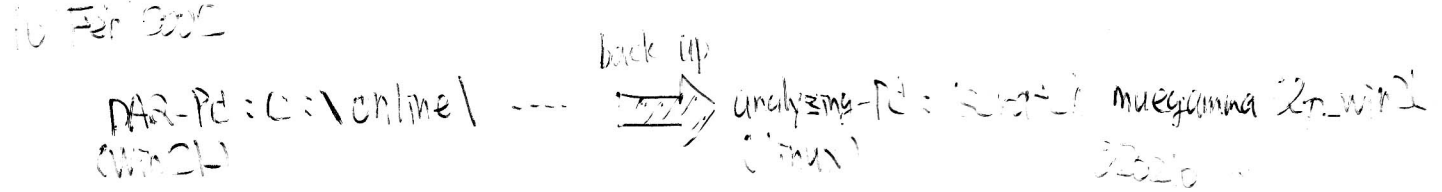
TC3 Lower

@ ADC spectrum of Trigger Counters @ Test configurations.



6/02/2002

6:00 Vessel outer press 8.7×10^{-4} Pa



Policy of Data Directory

◎ DAQ-PC (win2k)

Current codes and data

- e:\online\ (8,915,948 bytes) (now 94 MB free!!) — kumacs, source codes,
- MIDAS data (*.odb, *.mid, *.rz)
- ~~*.rz files~~
- hv data (*.hv)

day / month name / year

Storage for back up

- e:\online\ (60,942,240 bytes) (now ~40GB free)
- \data\
- ~~*.rz~~
- \hv data\

manual synchronous copy

another storage for back up

◎ Analyzing-PC (linux)

copied whole data

"online" directory

- backup on 16th of Feb. 2002
- /yymmdd/ — back up directory on dd-th of mm, 20yy

- odbedit : Logger/Data dir e:\online\data ⟹ C:\online\data
  resumed

data back up

- Data since 01/Jan/2002 are kept at C:\online\
- The other data (~31/Dec/2001) are moved to E:\online\.
  (*.odb, *.hst, *.idf, *.idx, *.mid are moved to E:\online\data\backup_Jul_to_Dec_31_2001\
  Most of them is data of Cesium ray experiment

Main --- Drive C: 373GB / 8.50GB % used, 4.76GB free

back up --- Drive E: 22.0GB / 57.2GB % used, 35.2GB free

~ 40GB free.

2:25. ~~Start Xe ignification~~

flow meter, integrated value, 10023.

JAS Xe AT LOW TEMP.

3:30 we try to switch on all the PMTs with gas Xenon keeping those PMTs OFF:

R3 BT38 L28 F1

R11 F2

F29

F34

successfully apply 700V to each PMT. We then load gd1.hv which has the proper channels switched off.

228

With respect of the file dg1.hv we rise of +100 V the pmts { BTR } { 2 3 8 9 } to increase the α-trigger rate.

after that the trigger rate is about ~ 100 Hz

The pressure of Xenon is 1,32 atm
The Temperature −92.6 UP
−78.4 DOWN

19:00 RUN 2139 Pedestals

19:01 RUN 2140 Calibration with LED 1 & 5

DURING LAST POINT ACQUISITION THERE WAS AN HV ERROR FOR CHANNEL { BT3 BT8 }

RUN 2141 " α " Aborted because of some trip as before

RUN 2142 "α-run"

- Looking at the calibration file we see that the LED produces very few photoelectrons. After check we decide to use these new values for the LED's at low temperature

{44, 45, 46, 47, 48}

Changed in fal.exe -

- Looking at the α-run we notice that the RIGHT-face α don't trigger so much, we lower the threshold to require only 2 PMT in the patch RIGHT-FORWARD

RUN 2144 Calibrations with new LED HV

RUN 2145 Alpha run.

AT THE END OF THIS RUN L18 TRIPPED.

20:15 start to ~~fill~~ add with Gas Xe ~~to recirculate~~

Start to liquefy.

17/02/2002

0:05 We measured R_{HV} @ ZIF connector outside vessel for bad channels (see P.227)

1	R3 :	1.0 kΩ, ~~short~~
45	R11 :	14 MΩ
157	BT38 :	open.
103	L28 :	14 MΩ
228	F1 :	14 MΩ
227	F2 :	0.9 kΩ
220	F29 :	14 MΩ
218	F34 :	14 MΩ

~~short~~ R3, F2 ~~short to ground inside vessel~~

BT38 ~~open~~ broken inside vessel.

~~[redacted]~~

19/02/2002

11:30 liquid level has approached at window of Top Wall PMTs.

21:25 Started SCFE. (DISABLE CH. 18-10)
Loading dg1.hv → 106 @ ROOM TEMP. WITH SOME (BAD) SWITCHED OFF

RUN 2146 PEDESTAL IN LIQUID XENON

We check if the LED is seen by PMTs. We flash 1&5 at 48 V is low.

22:40 Liquifaction finished. flowmeter 0 → 149158 l

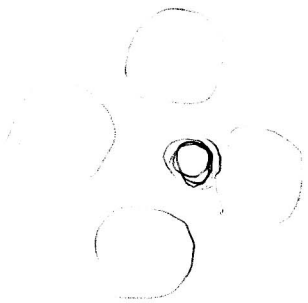
(flow meter integral 150000 ~ Liq. Xe 120 l. Tot.)

01.40 Pedestal runs & LED runs to adjust HV of the PMTS

2146 PED

2147 PED

2148 ⋮ 2155 } HVMATCH ADJUST HV = ON



After these runs the HV are saved in

LXe-1E6-after-HVMatch.hv

2161 10000 ev. LED 1 & 5. (New HV 49 → 53)

2162 Pedestal

2163 α-source run (seems to take comics) → due to small pulse height of α signal

1.000 events

→ HV increased

We raised the HV of PMT {LTRBT} {3289} OF +200 V

to trigger on α's

2164 CALIB(α) 49 - 53 Volts for LED

2165 PEDE

2166 α-run

2167 Calib(α) 45 - 49 Volts for LED *

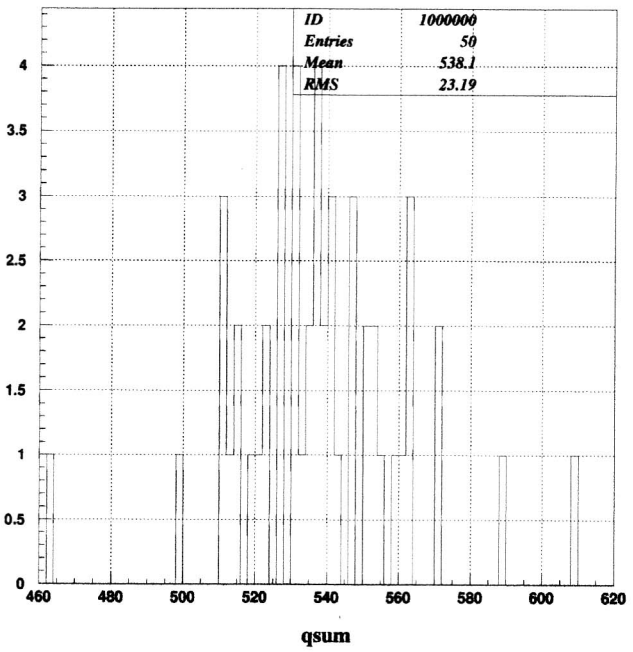
* The HV 49→53 Saturates The PMT which have been enhanced for trigger so we Repeat with 45→49

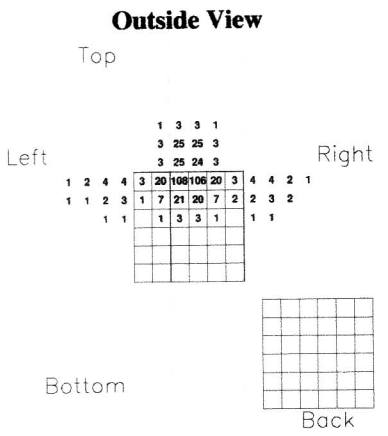
2168 Pedestal run ~~[illegible]~~ before cosmic ray run
HV brought back to 1×10^6 # channels.
2169 Cosmic ray run

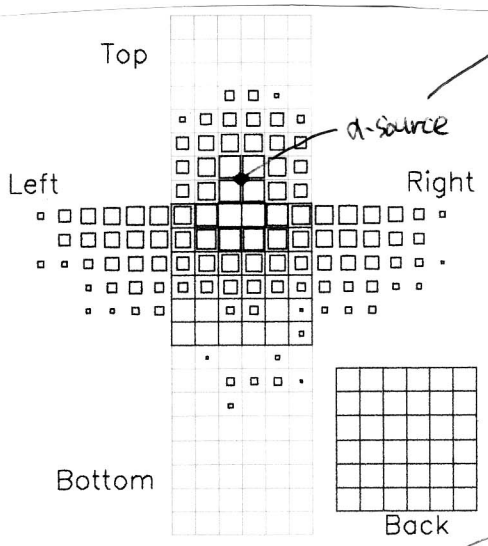
M.C. simulation (Japanese Version -- lproto-v0.3)

- $W_{ph} = 19.0$ eV
- $\lambda_{abs} = \infty$
- $\lambda_{sca} = 30$ cm
- QE = 5% ⊗ collection efficiency

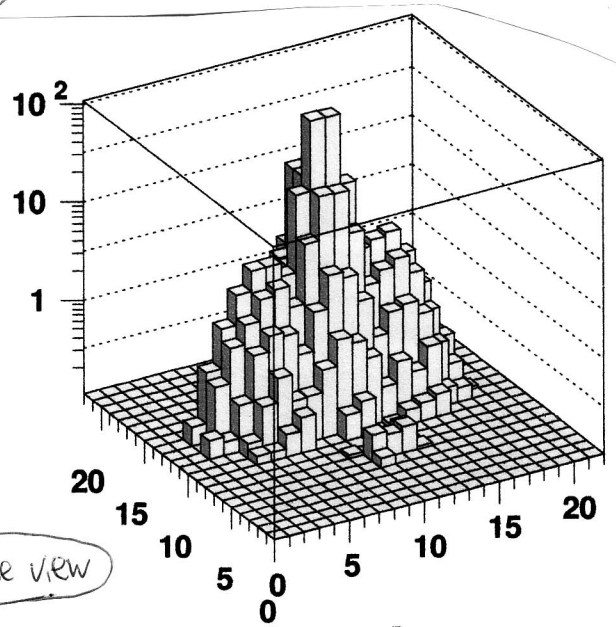
α-source







outside view



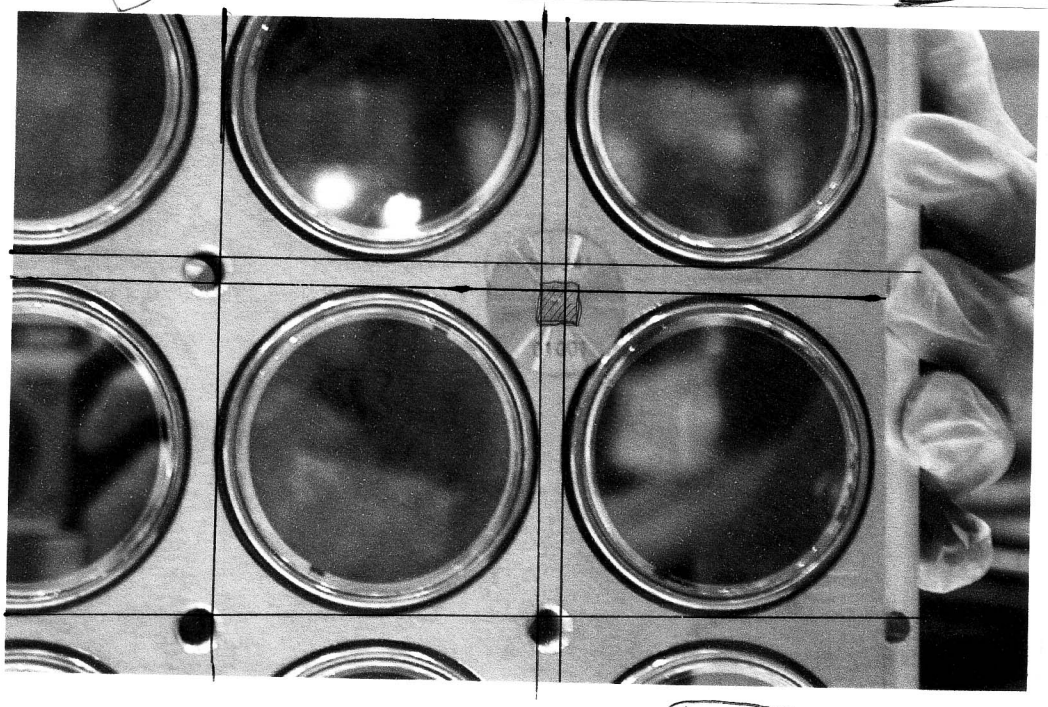
log scale

log scale

Looking Back upon

top

over-shifted α source on the right plate

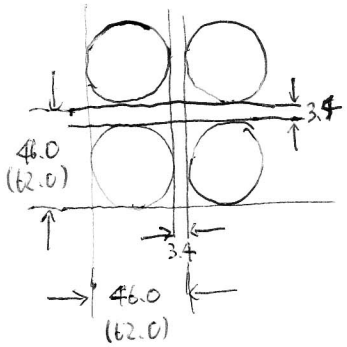


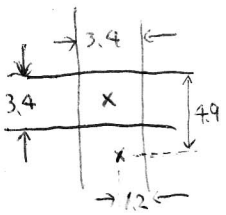
back

front

bottom

~muegamma/pics/010316/P1010095.JPG





$\frac{62.0}{46.0} \times (1.7 - 1.2) = 0.7$ mm forward

$\frac{62.0}{46.0} \times (4.9 - 1.7) = 4.3$ mm lower

(error is unestimated.)

20/Feb/2002

4:52. HV auto restart. something happened on HV module -4 (LRS1458)

"history"

Where is "Messages" file. ???

← Internal error ??

error code -702 ≡ HS_FILE_ERROR (midas.h)

(ref) midas.c : 14157

hs_count_events

out. 020220.hst DOES exist!! (e:\online\data\)

and ~~not~~ keep on updating.

(conflict with reset @ P226 ?)

10:30 #2169 stopped Many saturated channels *
Data directory changed e:\online\data
⇒ c:\online\data

* It seems to be a problem correlated with the injection. We try to restart a new run to see if everything is ok now.

11:05 #2170 Cosmic @1E6

11:55 It looks like that the history system is broken.
Ask Stefan how to restart the history system

Restart Cosmic Run since the FAL crashed.

12:56 #2171 Cosmic @ 1E6.

12:10 unplugged bad channels

	HV-ch
R3	0-0
F2	18-10
BT38	12-1

R11 900V ok → 800V
L28 950V ok → 850V
F1 NG
F29 850V NG 800V NG 750V ok
F34 900V NG 850V NG 800V ok

HV file modified R11 0V → 800V L28 → 850V
F29 0V → 750V
F34 0V → 800V

↳ saved as LXe_1E6_after-HVMatch_rec.hv

13:20 Loaded the new HV database file, with bad channels recovered.
No HV error.

14:04 #2172 Pedestal RUN
#2173 LED RUN 125 HV for LED 49 → 53

Online Gain Calculation

R11	0.39×10^6
F29	0.12×10^6
F34	0.48×10^6
L28	No Signal Due to the problem in the delay cable