

22/08/2005

10:00 LP & Electronics cabling disconnect started.

250 l Xe tank weight 837.7 kg.

(SN: 4058-2)

the weight at empty is 513.08 kg.

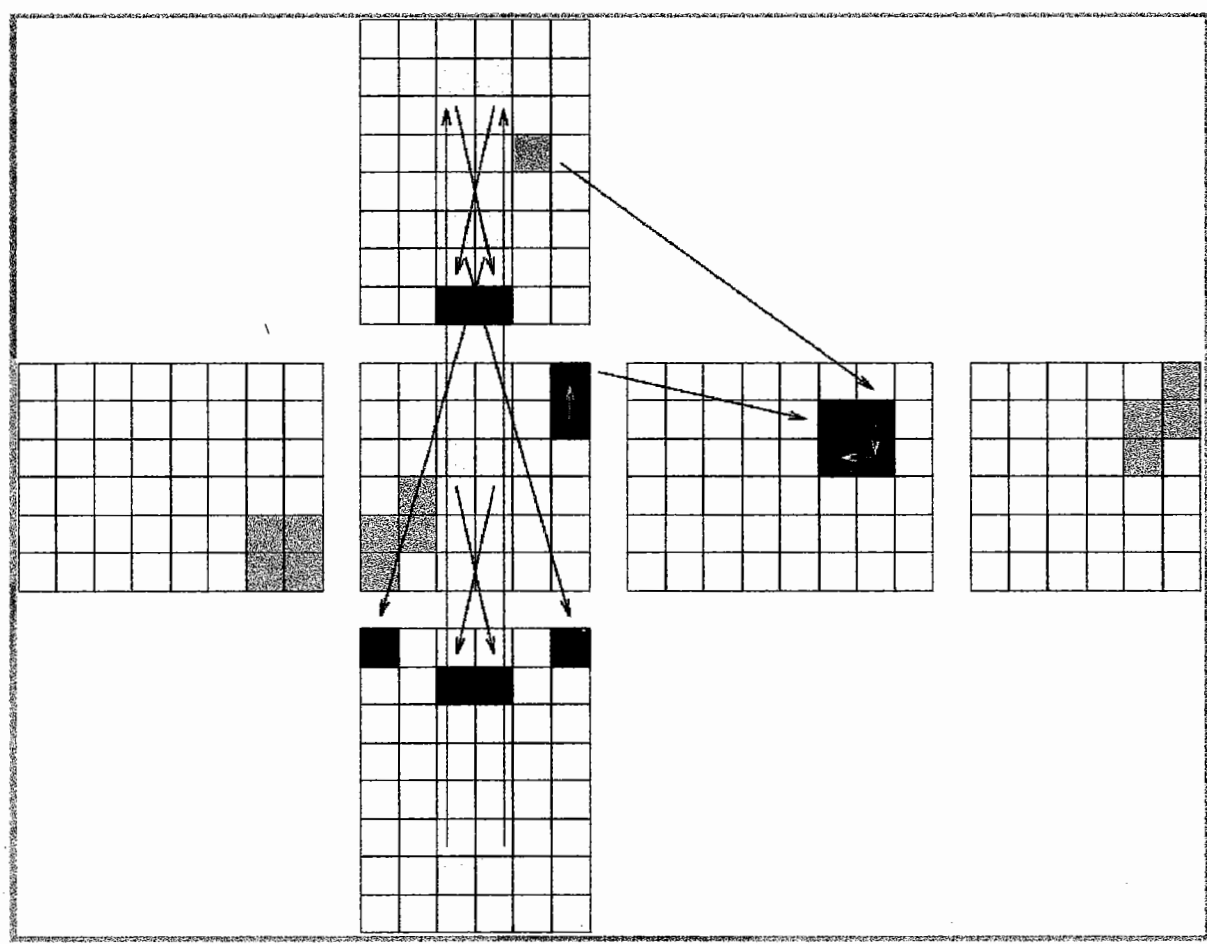
$$\rightarrow 837.70 - 513.08 = 324.62 \text{ kg.}$$

$$= 108.2 \text{ l Xe}$$

in 4058-2

29/08/2005

PMT replacement for the 2nd test



- : Gray — 12 PMTs leave
- : Yellow → Red — 8 PMT. leave after position change.
- (Black) : F30, R37 didn't work at 1st PMT test. will be re-checked at the different position.
- : Green QE < 10% will be checked at the different position.

T31 ~ T34 : The results between PISA and LP were different about QE.

serial	pos	G10	HVcable	comment	spacer								
OM23G6	BT0	G2-8	HV-42	[NULL]	[NULL]	(←T14)	12	TC0934	T5	G2-13	HV-240	ICEPP	1
OM22G1	BT5	G2-15	HV-34	[NULL]	[NULL]	(←T15)		TC0834	T6	G2-10	HV-40	ICEPP	1
OM06G3	F5	G4-5	HV-224	[NULL]	[NULL]			TC0838	T7	G2-26	HV-24	ICEPP	1
OM07G6	BK28	G8-14	HV-238	[NULL]	[NULL]			TC0735	T8	G1-10	HV-8	ICEPP	1
OL24G3	BT9	G1-3	HV-14	[NULL]	[NULL]	(←F22)		TC1111	T9	G1-1	HV-16	ICEPP	1
OM12G2	BK24	G8-4	HV-236	[NULL]	[NULL]			TC0980	T10	G2-17	HV-32	ICEPP	1
OM15G5	L6	G2-9	HV-39	[NULL]	[NULL]			TC0784	T11	G2-1	HV-48	ICEPP	1
1A16M1	BK23	G8-16	HV-169	[NULL]	[NULL]			TC0815	T12	G3-10	HV-72	ICEPP	1
1A18G2	BT8	G1-12	HV-6	[NULL]	[NULL]	(←F14)		TC0900	T13	G3-14	HV-68	ICEPP	1
OM19M2	F4	G4-3	HV-225	[NULL]	[NULL]			TC0591	T14	G3-18	HV-64	ICEPP	1
TB0392	F9	G1-21	HV-204	[NULL]	[NULL]			TC1099	T15	G3-29	HV-52	ICEPP	1
TB0380	F10	G1-25	HV-200	[NULL]	[NULL]			TC0800	T16	G3-25	HV-56	ICEPP	1
TB0371	T38	G7-29	HV-148	[NULL]	[NULL]	(←BT32)		TC0684	T17	G3-21	HV-60	ICEPP	1
TB0345	T37	G7-22	HV-156	[NULL]	[NULL]	(←BT38)		TC0816	T18	G5-30	HV-96	ICEPP	1
TB0555	L0	G2-5	HV-43	[NULL]	[NULL]			TC0860	T19	G4-22	HV-92	ICEPP	1
TB0357	L1	G2-21	HV-27	[NULL]	[NULL]			TC1101	T20	G3-2	HV-88	ICEPP	1
TB0527	L7	G2-25	HV-23	[NULL]	[NULL]			TC1102	T21	G3-5	HV-76	ICEPP	1
TB0462	BK34	G7-9	HV-174	[NULL]	[NULL]			TC1103	T22	G4-29	HV-44	ICEPP	1
TB0312	T2	G1-6	HV-12	[NULL]	[NULL]	(←T39)		TC1100	T23	G4-25	HV-84	ICEPP	1
TB0344	T3	G1-13	HV-4	[NULL]	[NULL]	(←T37)		TC1105	T24	G6-26	HV-120	ICEPP	1
TC0379	BT37	G7-24	HV-154	F_PISA	[NULL]	1 fix		TC1090	F29	G4-13	HV-220	ICEPP	1
TC0357	T31	G6-6	HV-140	F_PISA	[NULL]	} QE. 4		TC1112	F31	G4-8	HV-215	ICEPP	1
TC0142	T32	G6-10	HV-136	F_PISA	[NULL]			TC1121	F32	G4-6	HV-216	ICEPP	1
TC0058	T33	G6-21	HV-124	F_PISA	[NULL]			TC1106	F33	G4-19	HV-217	ICEPP	1
TC0342	T34	G6-17	HV-128	F_PISA	[NULL]			TC1087	F34	G4-17	HV-218	ICEPP	1
TC0060	R31	G6-7	HV-137	ICEPP				TC1093	F35	G4-15	HV-219	ICEPP	1
TC0068	F30	G4-10	HV-214	ICEPP		1 (←F30)		TC1081	BK0	G8-24	HV-229	ICEPP	1
TC0263	R14	G3-19	HV-61	ICEPP		1 (leave)		TC1067	BK1	G8-12	HV-171	ICEPP	1
TC0261	R37	G7-23	HV-153	ICEPP		1 (←R36)		TC1104	BK2	G8-31	HV-177	ICEPP	1
TC0218	R32	G6-11	HV-130	ICEPP		1		TC1037	BK3	G8-19	HV-183	ICEPP	1
TC0576	BT39	G7-27	HV-150	ICEPP		1 (←TC0275)		TC0983	BK4	G8-32	HV-161	ICEPP	1
TC0571	R36	G7-19	HV-157	ICEPP		1 fix		TC1091	BK5	G8-22	HV-166	ICEPP	1
TC0575	BT38	G7-31	HV-146	ICEPP		1 (←T28)		TC1029	BK6	G8-10	HV-230	ICEPP	1
TC0533	T35	G6-13	HV-132	ICEPP		1 fix	3	TC1030	BK7	G8-29	HV-178	ICEPP	1
TC0692	T41	G7-6	HV-184	to_PISA	[NULL]	1 { 2		TC1031	BK8	G8-17	HV-231	ICEPP	1
TC0907	BK14	G8-15	HV-185	ICEPP				TC1035	BK9	G8-7	HV-232	ICEPP	1
TC0911	BK15	G8-5	HV-190	ICEPP				TC1033	BK10	G8-30	HV-162	ICEPP	1
TC0913	BK16	G8-28	HV-163	ICEPP				TC1032	BK11	G8-20	HV-167	ICEPP	1
TC0917	BK17	G8-18	HV-168	ICEPP				TC1018	BK12	G8-8	HV-233	ICEPP	1
TC0930	BK18	G8-6	HV-235	ICEPP				TC1026	BK13	G8-27	HV-234	ICEPP	1
TC0932	BK19	G8-25	HV-180	ICEPP				TC1028	T25	G5-14	HV-116	ICEPP	1
TC0937	BK20	G8-13	HV-186	ICEPP				TC1076	T26	G5-18	HV-112	ICEPP	1
TC0918	BK21	G8-3	HV-191	ICEPP				TC1074	T27	G5-25	HV-100	ICEPP	1
TC0708	BK22	G8-26	HV-164	ICEPP				TC1077	T28	G5-21	HV-104	ICEPP	1
TC0924	BK25	G8-23	HV-181	ICEPP				TC1082	T29	G6-29	HV-108	ICEPP	1
TC0920	BK26	G8-11	HV-237	ICEPP				TC1064	T30	G6-2	HV-144	ICEPP	1
TC0935	BK27	G8-1	HV-192	ICEPP				TC1057	T36	G7-18	HV-160	ICEPP	1
TC0923	BK29	G8-2	HV-176	ICEPP				TC1071	T39	G7-25	HV-152	ICEPP	1
TC0916	BK30	G8-21	HV-182	ICEPP				TC1048	T40	G7-5	HV-179	ICEPP	1
TC0910	BK31	G8-9	HV-188	ICEPP				TC1054	BT1	G2-24	HV-26	ICEPP	1
TC0912	BK32	G7-7	HV-172	ICEPP				TC1042	BT2	G1-8	HV-10	ICEPP	1
TC1141	BK33	G7-8	HV-173	ICEPP				TC1045	BT3	G1-15	HV-2	ICEPP	1
TC0929	BK35	G7-10	HV-175	ICEPP				TC1055	BT4	G2-31	HV-18	ICEPP	1
TC0931	T0	G2-6	HV-239	ICEPP				TC1053	BT6	G2-12	HV-38	ICEPP	1
TC0906	T1	G2-22	HV-28	ICEPP				TC1034	BT7	G2-28	HV-22	ICEPP	1
TC0936	T4	G2-29	HV-20	ICEPP				TC0979	BT10	G2-19	HV-30	ICEPP	1
								TC0990	BT11	G2-3	HV-46	ICEPP	1

29/08/2005

29/08/2005

TC0964	BT12	G3-12	HV-70	ICEPP	1	TC1251	R4	G2-32	HV-17	ICEPP	1
TC1000	BT13	G3-16	HV-66	ICEPP	1	TC1204	R5	G2-16	HV-33	ICEPP	1
TC1006	BT14	G3-20	HV-62	ICEPP	1	TC1124	R6	G2-11	HV-37	ICEPP	1
TC0998	BT15	G3-31	HV-50	ICEPP	1	TC1274	R7	G2-27	HV-21	ICEPP	1
TC0972	BT16	G3-27	HV-54	ICEPP	1	TC1273	R8	G1-11	HV-5	ICEPP	1
TC1008	BT17	G3-23	HV-58	ICEPP	1	TC1276	R9	G1-4	HV-13	ICEPP	1
TC1011	BT18	G5-32	HV-94	ICEPP	1	TC1267	R10	G2-20	HV-29	ICEPP	1
TC0988	F21	G1-31	HV-194	ICEPP	1	TC1272	R11	G2-4	HV-45	ICEPP	1
TC0996	F22	G1-23	HV-202	ICEPP	1	TC1265	R12	G3-11	HV-69	ICEPP	1
TC1004	F23	G4-11	HV-221	ICEPP	1	TC1266	R13	G3-15	HV-65	ICEPP	1
TC0999	F24	G4-12	HV-213	ICEPP	1	TC1271	R15	G3-32	HV-49	ICEPP	1
TC1009	F25	G1-26	HV-199	ICEPP	1	TC1277	R16	G3-28	HV-53	ICEPP	1
TC0984	F26	G1-22	HV-203	ICEPP	1	TC1240	R17	G3-24	HV-57	ICEPP	1
TC0981	F27	G1-17	HV-207	ICEPP	1	TC1285	R18	G5-31	HV-93	ICEPP	1
TC0878	F28	G1-27	HV-198	ICEPP	1	TC1295	R19	G4-23	HV-89	ICEPP	1
TC1153	L5	G2-14	HV-35	ICEPP	[NULL]	TC1287	R20	G3-3	HV-85	ICEPP	1
TC1154	L4	G2-30	HV-19	ICEPP	[NULL]	TC1293	R21	G3-8	HV-73	ICEPP	1
TC1158	L3	G1-14	HV-3	ICEPP	[NULL]	TC1296	R22	G4-32	HV-77	ICEPP	1
TC1152	L2	G1-5	HV-11	ICEPP	1	TC1299	R23	G4-28	HV-81	ICEPP	1
TC1127	L8	G1-9	HV-7	ICEPP	1	TC1294	R24	G6-27	HV-117	ICEPP	1
TC1163	L9	G1-2	HV-15	ICEPP	1	TC1288	R25	G5-15	HV-113	ICEPP	1
TC1160	L10	G2-18	HV-31	ICEPP	1	TC1283	R26	G5-19	HV-109	ICEPP	1
TC1161	L11	G2-2	HV-47	ICEPP	1	TC1298	R27	G5-28	HV-97	ICEPP	1
TC1159	L12	G3-9	HV-71	ICEPP	1	TC1130	R28	G5-24	HV-101	ICEPP	1
TC1144	L13	G3-13	HV-67	ICEPP	1	TC1133	R29	G6-32	HV-105	ICEPP	1
TC1146	L14	G3-17	HV-63	ICEPP	1	TC1341	R30	G6-3	HV-141	ICEPP	1
TC1139	L15	G3-30	HV-51	ICEPP	1	TC1360	R33	G6-24	HV-121	ICEPP	1
TC1140	L16	G3-26	HV-55	ICEPP	1	TC1355	R34	G6-20	HV-125	ICEPP	1
TC1137	L17	G3-22	HV-59	ICEPP	1	TC1338	R35	G6-16	HV-129	ICEPP	1
TC1157	L18	G5-29	HV-95	ICEPP	1	TC1242	R38	G7-32	HV-145	ICEPP	1
TC1138	L19	G4-21	HV-91	ICEPP	1	TC1331	R39	G7-28	HV-149	ICEPP	1
TC1193	L20	G3-1	HV-87	ICEPP	1	TC1334	R40	G7-1	HV-187	ICEPP	1
TC1182	L21	G3-6	HV-75	ICEPP	1	TC1339	R41	G7-2	HV-189	ICEPP	1
TC1183	L22	G4-30	HV-79	ICEPP	1	TC1326	F0	G4-20	HV-209	ICEPP	1
TC1180	L23	G4-26	HV-83	ICEPP	1	TC1343	F1	G4-2	HV-228	ICEPP	1
TC1207	L24	G6-25	HV-119	ICEPP	1	TC1312	F2	G4-4	HV-227	ICEPP	1
TC1203	L25	G5-13	HV-115	ICEPP	1	TC1345	F3	G4-1	HV-226	ICEPP	1
TC1210	L26	G5-17	HV-111	ICEPP	1	TC1307	F6	G4-18	HV-210	ICEPP	1
TC1219	L27	G5-26	HV-99	ICEPP	1	TC1336	F7	G1-28	HV-197	ICEPP	1
TC1184	L28	G5-22	HV-103	ICEPP	1	TC1330	F8	G1-18	HV-208	ICEPP	1
TC1194	L29	G6-30	HV-107	ICEPP	1	TC1318	F11	G4-7	HV-223	ICEPP	1
TC1217	L30	G6-1	HV-143	ICEPP	1	TC1320	F12	G4-16	HV-211	ICEPP	1
TC1216	L31	G6-5	HV-139	ICEPP	1	TC1308	F13	G1-24	HV-201	ICEPP	1
TC1255	L32	G6-9	HV-135	ICEPP	1	TC1311	F14	G1-32	HV-193	ICEPP	1
TC1257	L33	G6-22	HV-123	ICEPP	1	TC1280	F15	G1-29	HV-196	ICEPP	1
TC1231	L34	G6-18	HV-127	ICEPP	1	TC1300	F16	G1-19	HV-206	ICEPP	1
TC1258	L35	G6-14	HV-131	ICEPP	1	TC1013	F17	G4-9	HV-222	ICEPP	1
TC1259	L36	G7-17	HV-159	ICEPP	1	TC1310	F18	G4-14	HV-212	ICEPP	1
TC1245	L37	G7-21	HV-155	ICEPP	1	TC1241	F19	G1-20	HV-205	ICEPP	1
TC1252	L38	G7-30	HV-147	ICEPP	1	TC0168	BT19	G4-24	HV-90	F_PISA	[NULL]
TC1253	L39	G7-26	HV-151	ICEPP	1	TC0454	BT20	G3-4	HV-86	F_PISA	[NULL]
TC1233	L40	G7-3	HV-165	ICEPP	1	TC0480	BT21	G3-7	HV-74	F_PISA	[NULL]
TC1243	L41	G7-4	HV-170	ICEPP	1	TC0486	BT22	G4-31	HV-78	F_PISA	[NULL]
TC1260	R0	G2-7	HV-41	ICEPP	1	TC0504	BT23	G4-27	HV-82	F_PISA	[NULL]
TC1268	R1	G2-23	HV-25	ICEPP	1	TC0066	BT24	G6-28	HV-118	F_PISA	[NULL]
TC1263	R2	G1-7	HV-9	ICEPP	1	TC0134	BT25	G5-16	HV-114	F_PISA	[NULL]
TC1262	R3	G1-16	HV-1	ICEPP	1	TC0500	BT26	G5-20	HV-110	F_PISA	[NULL]

TC0443	BT27	G5-27	HV-98	F_PISA	[NULL]
TC0297	BT28	G5-23	HV-102	F_PISA	[NULL]
TC0477	BT29	G6-31	HV-106	F_PISA	[NULL]
TC0453	BT30	G6-4	HV-142	F_PISA	[NULL]
TC0420	BT31	G6-8	HV-138	F_PISA	[NULL]
TC0174	BT32	G6-12	HV-134	F_PISA	[NULL]
TC0193	BT33	G6-23	HV-122	F_PISA	[NULL]
TC0496	BT34	G6-19	HV-126	F_PISA	[NULL]
TC0432	BT35	G6-15	HV-133	F_PISA	[NULL]
TC0043	BT36	G7-20	HV-158	F_PISA	[NULL]
TC0363	F20	G1-30	HV-195	F_PISA	[NULL]

PMTs with some trouble(s).

R37 → R32 TC 0118 photocathode air leak.

TC 0275 (R32) still there.

BT26 (TC 0500) Metal tube damaged (several dents)

F30 → R31 TC 0060 : The core and ground line of the HV cable was connected wrong on the base circuit board.

TC 0379 BT37 : land unstuck. Board replaced.

TC 0575 BT38 } Resistance was slightly different.
TC 0576 BT39 }

Missing PMTs

TC 1129, TC 1302

total installed PMTs.

Previous tested PMTs 35.

ICEPP PMTs 184.

PISA tested PMTs 19.

238

29/08/2005 ~ 23/09/2005

- SPacer install & PMT install into LP.
- PMT signal & HV cable resistance check.

26/09/2005 LED replacement.

LED 1, 4, 5 didn't flash.

Preliminary measurement showed LED 3 & 7 were unstable.

We replaced 1, 3, 4, 5, 7 LED to new ones, and changed Polarity of all LEDs at the connection of LED and cable. Now we can directly use CAEN LED driver without inverter.

27/09/2005 Am source installed.

28/09/2005 PMT holder installed into LP.

29/09/2005 evacuation started.

30/09/2005 He leak check } No leak found
03/10/2005 " }

4/10/2005

14:30 IV 6.4×10^{-2} Pa

OV ~~part~~ 2.6×10^{-3} Pa.

Purif 5.3×10^{-5} Pa.

7/10

3.8×10^{-2}

10/10/2005.

IV 3.1×10^{-2} Pa

OV 1.3×10^{-2} Pa

Purif 2.7×10^{-5} Pa.

Close the gate valves to do the build-up test.

0.5 min 7.2×10^{-2} Pa

1 min 1.2×10^{-1} Pa

2 min 2.0×10^{-1} Pa

4 min 3.8×10^{-1} Pa

6 min 5.9×10^{-1} Pa

8 min 7.9×10^{-1} Pa

10 min 1.0×10^0 Pa

20 min 1.9×10^0 Pa

Need to repair heat insulators around the input to the LP.

10/10/2005

9:25 Xenon is filled into the LP.

Pumps (Liner, Puri. line) are off

10:50 Finished filling xenon 0.2 MPa ()

Weight of the tank 843.92 kg

10:51 Refrigerator start set point 167k

11:00

~ 11:00 N₂ flow control started 0.190 ~ 0.200 MPa

11:45 0.180 ~ 0.190 MPa

12:15 0.150 ~ 0.160 MPa

21:50 Filled 400L Dewar (~350L)

11/10/2005 N₂ level 60%

7:15 Temperature SM hot -64.27

HL up -76.24

HL low -71.87

Cold head -99.09

Minco -75.80

Pressure 0.127 MPa (0.120 ~ 0.130 MPa Control)

No N₂ flow

Start to fill xenon

11/10/2005

7:20 1.4 l/min

7:26 3.3 l/min

7:40 5.7 l/min

7:47 10.0 l/min

Pressure Range 0.130 - 0.140 MPa
↓
and then changed to 0.120 - 0.130 MPa again

8:05 5.00 l/min

8:25 7.50 l/min

8:37 Flow rate increasing slowly 9.02 l/min
(no change of any control)

14:26 Flow rate has been increased gradually

Now 18.62 l/min

N₂ consumption ~ 70 min/hour
(only once)

14:40 49.10 l/min

Weight of the tank 813.34 kg

~ 40 l liquefied

23:05 Liquefaction stopped at Tank weight 767.22 kg
(paused)

• Only main valve on the tank closed

• Refrigerator control ON at pressure control mode
(set point 0.12 MPa)

• LN₂ Dewar ~ 36%

• Heater OFF at tank regulator

↳ Be sure to switch ON when you start the liquefaction again tomorrow morning

01:05 It is found that the refrigerator CH heater was OFF.
⇒ ON.

12/10/2005

7:25

Xenon level 0.33 LN₂ level 37%
Pressure 0.108 MPa (While the set point is 0.120 MPa)
Heater Power 100% !

Restart liquefaction. Tank valve opened.
Flow rate 18.36 l/min

7:30 Heater Control is switched to "Temperature Control mode".
Now heater Power 0%

9:26 Flow rate reduced 19 l/min → 7.5 l/min → 15.7 l/min

14:23 Flow rate 16.4 l/min
Due to this slightly lower flow rate, LN₂ consumption is almost 0 now.

Surface level level low 0.57

Tank weight 718.94 kg

125 kg ~ 42 l liquefaction finished.

N₂ tank 450 l

22:55

~~stop~~ pause liquefaction (close valve on the top of 250 l
turn off heater for regulator)

level meter low 0.84

Tank weight 665.42 kg

LN₂ 138 l

13/10/2005

7:10

Xe level low 0.83 LN₂ 30%

Pressure 0.114 MPa

Heater power 100%

Restart liquefaction flow rate 16.6 l/min

14:35

Xe level low 0.85

Xe level up 0.15 LN₂ 30%

Tank weight 617.92 kg

..... 75 l liquefaction finished.

14/10/2005
9:07

liquefaction paused

level up 0.86
low 0.46

Tank 555.5 kg

~ 96 l liquefied.

(heating regulator is not necessary,
because pressure of Tank is low)

14/10/2005

7:10

Xe level low 0.87
up 0.45

Inner pressure 0.12 MPa

Heater power 100%

LN₂ tank level 20%

Liquefaction restarted. flowrate ~ 16.7 l/m

14:00

Flow was ~ 0 l/m.

liquefaction finished.

Xe level low 0.86
up 0.65

Xe tank weight 527.20 kg

105.60 liquefied.

250l Xe tank valve closed

SCF1001 mode changed to "stable operation"

from "Liquefaction"

15:25

Circulation start

19:30

Xe tank weight 518.14 kg.

(I removed high pressure pipes on the top of 250l tank,
because those will be used at TKS.)

20:00

HV on (only hv01)

All 800V except for L41

• Resistance of L41 is 1.6 MΩ at output of hv01.
L41 → 0V

Saved as 051014_all800.hv

22:50

(HV all off
Circulation stop

15/10/2005

7:15

Circulation restart flow rate ~ 7.1 l/m
HV on.

22:57

(HV all off
Circulation stop

16/10/2005

7:45

Circulation restart

flow rate 7.12 l/m

Tried to Switch ON HV → LeCroy 1458 module
"HV Error"

⇒ Switch off LeCroy HV module

• switch ON again

• Load HV table at HV editor. ⇒ OK!

23:00

HV all off

HV Error ⇒ Recovered

Circulation stop

17/10 2005

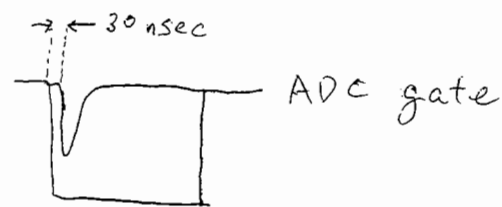
7:20

Circulation restart

HV ON.

pedestal check O.K.

LED timing check



LED pulse height $\begin{pmatrix} 90 \\ 91 \\ 92 \\ 93 \\ 94 \\ 95 \end{pmatrix}$ with 10dB attenuate

17/10 2005

23:00

HV off
Circulation stop

18/10 2005

7:20. Circulation Restart, HV ON.

19/October 2005

7:10 HV off
gas circulation stop

7:03 circulation started 7.3 l/min

Pressure level is slowly increasing
from 0.115 MPa to 0.118 MPa

Cold head heater power 100%

HV setting file 051014_all800. hv is loaded.

HV ON

Ref control with pressure at 0.130 MPa

19/Oct/2005

8:30 No response from the HV card 15. From alien?

Take it out and check. HV cable number ~~180-180~~

OK. the electrical connection was found to be unstable
now fixed

9:43

Eflow rate 8.2 l/min, 0.128 MPa
Heater 100%

MSCB HV installed

MSCB HV ch	HV num
0	192
1	193
...	...
47	239

48 + 1 PMTs are connected to the new HV modules

* additional 1 CH

BK0 - 164 \Rightarrow MSCB HV 48ch

(Manually step-down the power-supply before turn off in HV Edit.)

20/Oct./2005

00:40 Test DAQ

pedestal check

~~152~~ 152 (11-56) } Nentry
240 (9-48) } broad }
BK25 262 (9-70)
BK4 271 (9-79) } a bit broad
No PMT connect.

MSCB HV 40ch tripp many times
(F23)

L41 HV cannot be applied. ~~off~~ \leftarrow this is always off

20/October/2005

1:15 circulation stop
HV off

7:04 Circulation started flow 7.6 l/min

Pressure is going up from 0.117 MPa
Cold head heater power 100%

Send to apply HV 300 HV for all

F9, F30 easy to trip

All 300 V applied except F9, ~~300V~~²⁵⁰

400V " ~~250V~~²⁷⁰

500V " 300V

10:10 600V " F9 250V

10:30 600V " F30 300V

11:30 700V " F9 250V
F30 300V

Saved as 051020-1.lv

11:50 Error message "mscbdev-error" appears continuously

Mode 1000 Rebooted but no effect

SC front end stopped / started

OK. It seems to be fixed

11:57 700V for all PMTs (~~the~~ L31 off) except F9 310V
F30 510V

26/Oct/2005

12:01

Pedestal Test
RUN 9750 No data written
Pedestal RUN

broad Pedestal channel. (RMS > 5) & something bad

64	ADC0	S13-C68	Mean = 0	OK (disto noise was away)
78		S13-C78	"	OK (" ")
91		S13-C91	"	OK (" ")
105		S11-C9	"	OK (" ")
141		S11-C45	"	OK (" ")
143		S11-C47	"	OK (" ")

240 S9-C48 RMS 5.319 + Not connected

All OK ~~over~~ Very Good!

12:20

HV setting status

All 700V except

L41	0V
E34	
F9	330V
F30	530V

These two channels need VERY slow ramping ~.1V/sec.

Hesitantly improved after going.

12:47

LED Test RUN No data written

with 50 all outputs are 90 → 95 with a step size of 1

14:30

Stop Slow Central Frontend

To fix MSCB HV ramping problem

20/Oct./2005

17:55 LED test

LED set	
(#2, #6)	OK
(#1, #5)	X OK
(#3, #7)	OK
(#4, #8)	OK

width 50 height 90 → 95

test each LED individually
but #1 doesn't light

We inserted a pulse generator to the power line of #1 LED but it did not flash.

Start to adjust HV by using #3 & #7

18:50 RUN 9752 Pedestal

18:55 RUN 9753 LED #3, #7

50 usec 90 → 95 with a step size of 1

BK14 tripped ~~away~~ in the RUN

RUN 9754 LED #3 #7

HV adjust to 5×10^6 GeV

RUN 9755 LED #3, #7 HV adjust

RUN 9756 ~~same as 9754~~ HV adjust 1

RUN 9757 HV adjust 2

RUN 9758 HV adjust 3

Set max trip count of MSCBHVOR

ga 500

write 10 10

Now it recovers from trip automatically up to 10 times.

⇒ HV trips cannot be recovered automatically !!

20/October/2005

21:40 Run 9759 pedestal

21:50 megonm01 panic ⇒ reboot.

Signal check

No signal from LED comes at these channel. Only pedestal

Channel	ADC	PMT current	Signal at splitter	Notes
R7	58	OK		Not yet
L20	148	OK		fixed
L14	149	OK		fixed
R10	150	OK		fixed
F30	153	OK		fixed
F23				
R37	230	1.7 micro Amp		fixed.
BK29	241	OK	funny	Not yet
BK20	252	OK	seen.	Fixed

to be fixed.

23:00 F9 & F30 700 V can be applied, improved after aging.

23:29 Run 9760 pedestal

23:31 Run 9761 LED HV adjust to $5e5$ ①
LED setting (#3, #7) height 83 ~ 88

- F23 HV trip during the run.
- There is no overflow channel.

23:39 Run 9762 LED HV adjust to 5e5 ②

- There are no overflow channels but all channels under 1000.
→ step up LED height.

23:47 Run 9763 LED HV adjust to 5e5 ③

- LED amplitude 85 ~ 90
- F23 HV trip during the run.
- No overflow channels. LED amplitude can be stepped up much more.

F23. ~~is seen to~~ cannot tolerate the HV set to 5e5.

21 / October / 2005

0:00 gas circulation stop (stable operation mode)

Tonight HV keep on all night long.

7:00 Circulation Restarted

Compressor was stopped around 5:30 due to low pressure (as normal)

Wait until the loguel is stabilized

7:40 F25 HV trips frequently

Reduce HV setting 294 → 744V

Rtrip center of this channel. Reset

8:00 Stefan said, "HV edit of LINUX version is available now"

Signal check for the channels listed in the previous page

Bk20 no signal output from the splitter (Both demo connectors)

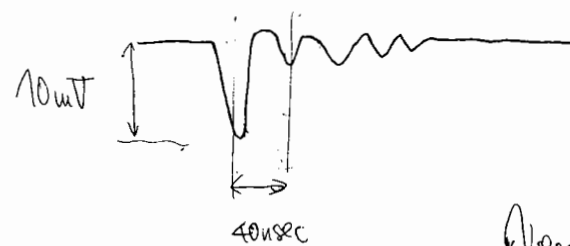
Signal OK at input. So due to splitter.

Change the splitter channel

3-5-2 ⇒ 3-8-2 Need to update PB

Bk29 ~~No~~ signal output from the splitter (Both demo connectors) Funny

Also at the input of the splitter



1000V applied

Need to check at feedthrough. Leave it now

650V

21/Oct/2005

R97

650V applied but only 7.7µA. HV 0-12-8.

??? HV cable is not connected ???

Maybe unplugged in the previous test.

Connected. OK. Current is normal

Now Splitter out can be seen.

750V applied

F30

ADC cable is not connected at the splitter output.

Signal is fine!

No cable between the ~~splitter~~ and Pandy connector!

OK. cable is prepared. Now we can see the signal at ADC input. But HV trips often!

Reset the trip center.

R10

No cable between the splitter and Pandy connector!

OK. NOW

L14

Same reason. Plugged

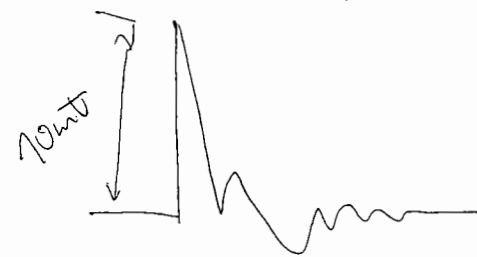
Splitter Module	3-7	Problem
⇒ Broken. OP-AMP removed. OK now		

L20

Same reason. Plugged

R7

Strange signal at the splitter input



← positive signal

Signal cable soldering on the base may be wrong? HV off

21 Oct 05

SUMMARY

Problems of most channels are now fixed except

{ R7 $10\mu\text{V}$ $1\mu\text{s}$ positive pulse at splitted input
 BK29 $10\mu\text{V}$ $1\mu\text{s}$ just noise?
 L41. impossible to apply HV

- Check R7, BK29 at the feedthrough connector later.
- Take L6D to check fixed channels and do gain adjust.

BK29. At the feedthrough exit signal exists.

We found that the cable is cut on the G10 board. → fixed.

R7. At the feedthrough exit. PIN collapsed!! → fixed somehow.

21 Oct 2005

17:00 Run# 9764 pedestal run.

ADC 148	5.2 ch.	(L20)	8540
ADC 149	No signal	(L14)	9100
150	6.0 ch.	(R10)	8290
153	8.2 ch.	(F30)	5000

Run # 9765 LED #3, #7
HV adjust to 5×10^5 Gain

F30 HV channel changed to ^{HV num} 241 from 225 because of many times hv trip. When we swapped channels of F30 to different one. HV was on. So, the HV channel might be a problem not PMT itself.

T17 HV trip. -
F24 HV trip

ADC #149 (L14) contains no data. But ADC #146 has some data. ???

ADC #149 (11-53) Mini Card changed.

#148, #150, #153 broad channels was not caused by Mini Card. Because there was no change after swapping mini card. Delay cable ???

21 / Oct / 2005

22:00 Run # 9766 pedestal
 22:05 # 9767 gain adjust
 LED #3, #7
 22:11 # 9768 "

pedestal broad channels change the delay cable

ADC #148, (~~3-5~~ ^{Burndy}) → #128 (2-33)
 " #149, (3-6) → #129 (2-34)
 " #150, (3-7) → #130 (2-35)
 " #153, (3-10) → #131 (2-36)

23:06 # 9769 pedestal
 23:11 # 9770 LED #3, #7
 gain adjust 5×10^5
 23:20 # 9771 "
 23:36 # 9772 LED #3, #7 gain calib.
 # 9773 junk
 9774 "
 9775 "
 0:01 # 9776 α

Circulation stop.
HT on.

22 / Oct. / 2005

pressure 0.116 MPa
 7:20 circulation ON
 flow 7.5 l/min
 F27 & F24, HV have tripped.
 8:27 Run 9777 pedestal
 9:23 Run 9778 pedestal (~ 9:00 inner pressure becomes stable
 heater power begins to go down
 LED setting #3 94-99 #7 87-92 balance LED amplitude
 between top and bottom, #7 #3
 9:25 Run 9779 LED HV adjust 5e5
 9:38 Run 9780 LED HV adjust to 5e5 ②
 some channel overflowed
 because, 9779. many channel HV shifted higher
 10:11 Run 9781 LED HV adjust to 5e5 ③
 LED #3 88-93
 #7 84-89
 No channels overflow
 10:19 Run 9782 pedestal
 10:26 Run 9783 LED (#3: #1, #8, #4, #3, #9) gain calib.
 11:05 Run 9784 LED HV adjust
 11:25 Run 9785 LED HV adjust
 11:33 Run 9786 pedestal
 11:35 Run 9787 LED gain calib (#3: 87-92, #7: 84-89)
 12:11 Run 9788 LED HV adjust
 12:19 Run 9789 LED HV adjust
 12:28 Run 9790 LED gain calib
 13:27 Run 9791 LED gain calib
Manually correct all HV values (because gain couldn't focus by HV adjust)
 14:36 Run 9792 LED gain calib #3 87-92 #7 84-89

↳ saved as " 051022-2.hv "

22/Oct/2005

14:48

Run 9793 LED gain calib, different LED amplitude.
~~LED~~ LED amplitude (#3 90-95, #7 88-93)

16:49

Run 9794 LED gain calib

LED (#2, #6).

#2 LED light was very small, so the setting
became rather big input voltage.

(#2) ... 130, 134, 138, 142, 146, 150

(#6) ... 90, 91, 92, 93, 94, 95.

ADC channel between 0 ~ 1000.

17:14

Run 9795 LED gain calib. (#2, #6)

different light setting. (larger setting)

(#2) 130, 140, 150, 160, 170, 180

(#6) 90, 92, 94, 96, 98, 100.

ADC channel between 0 ~ 2000.

22/Oct/2005

17:54 Run #9796 pedestal.

17:58 Run #9797 LED (#4, #8) Gain Calib.

LED setting (#4, 93-98, #8, 91-96)

19:02 Run #9798 LED (#4, #8) Gain Calib

LED setting (#4, 90-95, #8, 88-93)

megonln01 freeze. reboot.

I checked LED #1 and found that the cable just after
Burdy connector was cut. → fixed.

Now, all LED #1 ~ #8 are available.

21:31 Run #9799 pedestal

21:32 Run #9800 LED (#1, #5) Gain Calib

LED setting (#1, 105, 108, 111, 114, 117, 120)
(#5, 89-94)

21:44 Run #9801 LED (#1, #5)

LED setting smaller (#1, 95-111, step 3.)
#5, 86-91

22/Oct/2005

21:55 Run # 9802 LED (#3, #7)
reproducibility check.
same condition as #9792,

22:02 Run # 9803 ~~LED~~ pedestal

22:03 Run # 9804 LED (#3, #7)
same as #9792.

22:09 Run # 9805 LED (#3, #7)
same as #9792

22:19 Run # 9806 LED (#3, #7)
same as #9792.

LED setting summary

{ #1 105, 108, 111, 114, 117, 120
#5 89, 90, 91, 92, 93, 94

{ #2 130, 134, 138, 142, 146, 150
#6 90, 91, 92, 93, 94, 95

{ #3 87, 88, 89, 90, 91, 92
#7 84, 85, 86, 87, 88, 89

{ #4 93, 94, 95, 96, 97, 98
#8 91, 92, 93, 94, 95, 96

22/Oct/2005

22:45 Run # 9807 pedestal.
22:46 Run # 9808 LED #1. (105-120, step 3)
22:57 Run # 9809 LED #5 (89-94).

23 / Oct / 2005

7:03 Gas circulation started
BK25, F27, F24. HV ~~to~~ have tripped.

8:17 Run 9810 pedestal

8:28 Run 9811 LED gain calib (#3, #7)
same condition as #9792 & #9802

As above, gain shift higher than yesterday.

8:48 Run 9812 LED #3 (87-92) ^{LED Driver channel} ch2

8:56 Run 9813 LED #7 (84-89) ch4

9:06 Run 9814 LED #2 (130-150, step 4) ch2

9:12 Run 9815 LED #6 (90-95) ch4

9:20 Run 9816 LED #4 (93-98) ch2

9:26 Run 9817 LED #8 (91-96) ch4

HV adjust by hand.

10:24 Run 9818 LED gain calib. ses (#3, #7)

10:31 Run 9819
Pedestal

Run 9820 Junk

12:04 Run 9821 LED gain calib. ses (#3, #7)

23 / October / 2005

HV adjusted to 5e5 by hand again.

Modified especially out of 5e5. =>

HV setting saved as

051023-1.hv

Low gain PMT ^{BT10 HV num} (29) L5(38) ~~BK28(169)~~ BK28(174) F4 (236) over 850V
 High gain PMT BT17(57) T33(123) T32(135) BT39(149) ~~BK8(195)~~ under 650V

13:32 Run 9822 pedestal

13:34 Run 9823 LED #3, #7 gain 5e5.

START HV Scan

14:03 Run 9824 LED #3, #7 +50V (~ 1x10⁶)

14:09 Run 9825 "

14:19 Run 9826 LED #3, #7 +100V (~ 2x10⁶)

14:29 Run 9827 "

- #9826 & #9827, LED setting is same as previous runs. but several channels are over flowed.
- F4 (HVnum 236) demanded 1004 V, but voltage limit of power supply is 1000V, so F4 applied 987.9 V actually.

14:51 Run 9828 LED #3, #7 +0V gain 5e5. same as #9823

14:55 Run 9829 pedestal

In these two run, on F9 HV is not applied.

23 / Oct / 2005

16:47 Run # 9830 LED #3, #7 +0V gain 5e5

17:13 Run # 9831 LED #3, #7 +0V "

~~17:37~~ Run # 9832 pedestal

~~17:38~~ Run # 9833 LED #3, #7 -50V (~ 2x10⁵)
18:47

18:56 Run # 9834 LED #3, #7 -50V

19:45 Run #9835 pedestal

19:46 Run #9836 LED #3, #7 +150V

LED setting #3, 84-89, #7, 81-86

9837 LED #3, #7 +150V

20:14 Run # 9838 pedestal

20:15 Run # 9839 LED #3, #7 0V
Same as #9823.

20:24 Run # 9840 LED #3, #7
(setting #3 90-95, #7 88-93) high light input

20:30 Run # 9841 LED #3, #7

same as #9840
20:37 Run # 9842 LED #3, #7
Same as #9840:

20:43 Run # 9843 LED #3, #7
Same as #9840

23 / Oct / 2005

21:00 Run # 9844 LED #3, #7
(setting #3 84-89, #7 81-86)
low setting.

Run #9845 LED #3, #7
same as #9844

21:14 Run #9846 LED #3, #7
same as #9844

21:19 Run #9847 LED #3, #7
same as #9844

21:46 Run # 9848 pedestal

21:48 Run # 9849 LED #2, #6
(setting #2 130-150, step4 #6 90-95)

22:02 Run # 9850 same as #9849

22:14 Run #9851 LED #2, #6
(setting #2 130-180, step10, #6 90-100 step2)

22:22 Run # 9852 same as #9851

22:29 Run # 9853

23 / Oct / 2005

23:10 Run # 9854 LED #2, #6
setting #2 122-142, step4, #6 88-93

23:39 Run # 9855 "

Circulation stop.

24 / Oct / 2005

7:00 gas circulation started.

R11, Bk25, F27, F24, HV have been tripped.

8:47 Run 9856 pedestal

8:50 Run 9857 LED #2, #6. setting #2 122-142, #6 88-93
~~setting 130-150, #6 90-95~~
~~same condition as #9849, 9850~~
same condition as #9854, 9855,

9:03 Run 9858 LED #3, #7 (#3 87-92, #7 84-89)
same condition as #9823

9:11 Run 9859 LED #1, #5
Setting (#1 105-120, #5 89-94)

9:19 Run 9860 same as #9859

9:43 Run 9861 LED #1, #5 higher intensity
setting #1 108, 111, 114, 117, 120, 123
#5 90, 93, 96, 99, 102, 105

• During this run at F27, HV was tripped

9:50 Run 9862 LED #1, #5 higher intensity
same as #9861

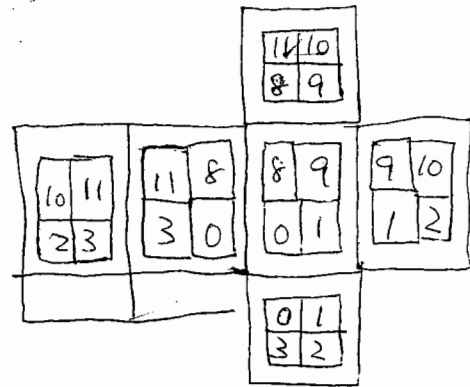
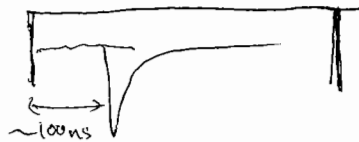
24 / October / 2005

~ 10:00 α signal check.

Discriminators for back trigger were ~~wrong ones~~

Disc 4,5,6,7 \Rightarrow Disc. 8,9,10,11

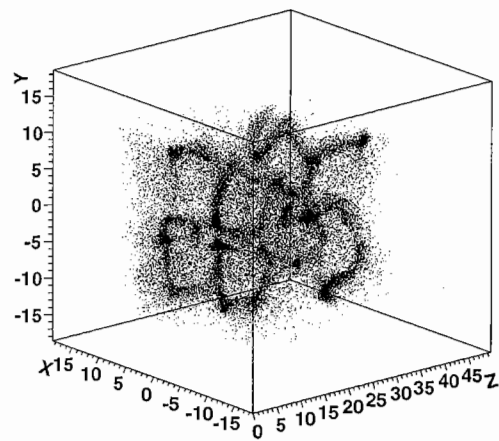
Timing



Now ready to take data

10:34 Run 9865 α ~10K events

Vertex in xenon



11:07 Run 9866 LED #1, #5 lower intensity
setting #1 103, 105, 107, 109, 111, 113
#5 86, 87, 88, 89, 90, 91

11:13 Run 9867 same as #9866

11:19 Run 9868 same as #9866

11:24 Run 9869 pedestal

24 / Oct / 2005

11:26

Run 9869 LED (#4, #8)
70 setting (#4 93-98, #8 91-96)

11:32

Run 9871 same as #9870

11:46

Run 9872 LED #4, #8 higher intensity
setting #4 90, 92, 94, 96, 98, 100
#8 89, 91, 93, 95, 97, 99

• During this run F24 HV was tripped

11:54

Run 9873 same as #9872

• LED was unstable?

In 3rd step, there are double peaks.

12:03

Run 9874 same as #9872

12:36

Run 9875 same as #9872

12:42

Run 9876 LED #4, #8 lower intensity
setting (#4 89, 90, 91, 92, 93, 94
#8 88, 89, 90, 91, 92, 93)

12:47

Run 9877 same as #9876

12:53

Run 9878 same as #9876

15:38

Run 9880 pedestal

15:41

Run 9881 LED #2, #6 Lower intensity
setting #2 122 - 142
#6 88 - 93

16:10

F27 tripped

16:30

BK14 tripped

It is found that the fitting region is too narrow

for the gain calculation.
This ~~narrow region~~ was just for avoiding tail effect during the π^0 -beam test.

$\pm 1.5 \cdot \sigma \Rightarrow \pm 2.5 \cdot \sigma$

@ LPXE Gain Calib. cpp

▷ The accuracy of the gain calibration seems [✓] better slightly after this modification

▷ The calibration data is not reprocessed yet before #9881
 ⇒ should be done later on.

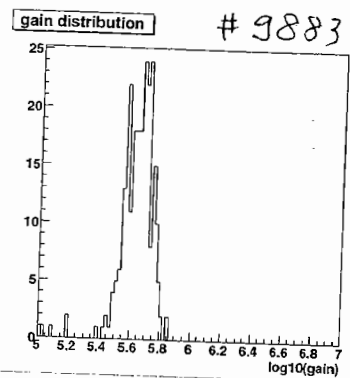
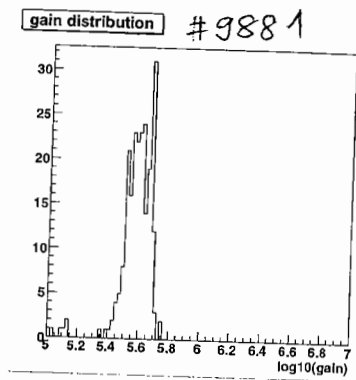
17:13 #9882 pedestal

#9883 LED (#2, #6) • Lower intensity
 • CAEN LED driver channel swapped

CH2 ⇒ LED #6

CH4 ⇒ LED #2

• swapped in led.dat also



Gain distribution systematically shifted

#9884, #9885 Junk

#9886 LED #2, #6 • Lower intensity
 • No swap in LED driver

19:30 #9887 LED #2, #6 - Lower intensity
 • LED #2 ← LED driver CH3
 LED #6 ← " CH5

20:05 BK25, F24, F27 HV trip

▷ CAEN LED driver noise level and stability.

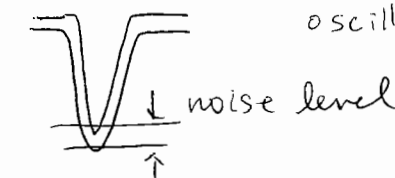
▷ Noise level

width=50 Pulseheight = 120

CH	Pulse height [V]	noise [mV]
0	-2.69	100
1	-2.71	210
2	-2.76	190
3	-2.67	190
4	-2.77	220
5	-2.69	80

signal from LED driver is seen at oscilloscope with -10 dB attenuator

This noise level is measured as a line width of the signal with persistence of 500 msec on the oscilloscope



~~(Linearity) + noise level~~

▷ Pulse height dependence of noise level

CH	PH	Pulse height [V]	noise [mV]
2	120	-2.72	190
	90	-1.98	190
	100	-2.23	190

▷ We found that signal to the LED from CAEN driver is rather sensitive to the layout of the cable.

Pulse height can be easily changed if we change the cable layout.

Please ~~be~~ sure NOT to touch the cable to the LED during the calibration run

▷ Try to calculate gain with CAEN driver CH0 & 5
 .22:55 #9888 pedestal (smaller noise level)

#9889 LED @ 5×10^5 gain

LED	CAEN	PH
#2	CH0	(120, 124, 128, 132, 136, 140)

LED	CAEN	PH
#6	CH5	(91, 92, 93, 94, 95, 96)

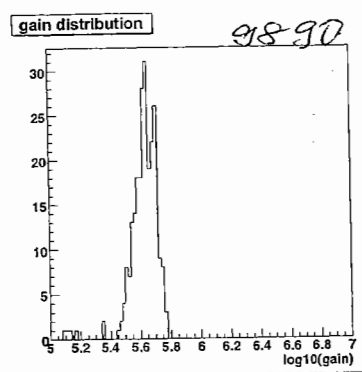
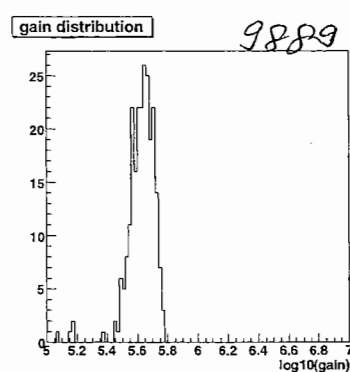
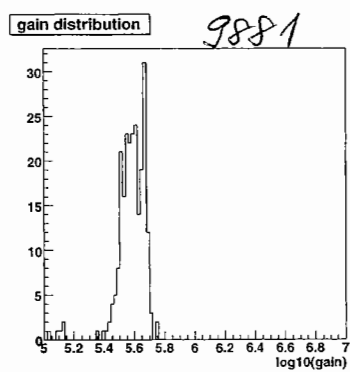
23:21 #9890 LED @ 5×10^5 gain

LED	CAEN	PH
#2	CH0	(122, 126, 130, 134, 138, 142)

LED	CAEN	PH
#6	CH5	(91, 92, 93, 94, 95, 96)

23:40 F27 tripped

The gain calculated with new setup is systematically higher than before. by ~~more~~ more than 10%. Why??



▷ Plan for tomorrow.

- Investigate strange shape of α ring.
- CR counter setup
- Gain calibration @ 800V
- HV-scan
- Rate dependence

2005/10/25

7:05 start circulation

7:15 #9891 pedestal run C.K.

7:16 #9892 LED LED(2,6) Driver (0.5) bad run

7:21 #9893 same as 9892

7:29 #9894 α

from #9893			
F30	0.14 e6	+ 100	
T3	0.22 e6	+ 50	
R10	0.14 e6	+ 100	
L14	0.14 e6	+ 100	
T12	0.29 e6	+ 50	
T15	0.29 e6	+ 50	
L20	0.12 e6	+ 100	
T24	0.30 e6	+ 50	
R41	0.16 e6	+ 100	
Bk0	0.29 e6	+ 50	
Bk23	0.29 e6	+ 50	

8:00 #9895 pedestal for HV adjust

#9896 pedestal for HV adjust

#9897

}

#9902

LED HV adjust with LED(2.6) Driver (0.5)

↑
 5×10^5 ?