

16:40 Auto LN<sub>2</sub> fill  
P:v stoppage  
16:46

Run 12:	22.5 cm	171.20 Hz	450s
Run 13:	21.5 cm	172.20 Hz	450s
Run 14:	20.5 cm	172.03 Hz	450s
Run 15:	19.5 cm	172.08 Hz	450s
Run 16:	18.5 cm	174.75 Hz	450s
Run 17:	17.5 cm	170.40 Hz	450s
Run 18:	16.5 cm	167.99 Hz	450s
Run 19:	15.5 cm	165.77 Hz	450s
Run 20:	14.5 cm	158.05 Hz	450s
Run 21:	13.5 cm	151.11 Hz	450s
Run 22:	12.5 cm	143.77 Hz	450s
Run 23:	11.5 cm	128.27 Hz	450s

4

6/3/2010

13:00 Insert Ba 133 ① 34.5 cm

13:05 Start filling inner dewer

13:13 Stop filling inner dewer

13:16 Series 465 Ba 133 ① 34.5 cm, 30 min runs  
~~Start pumping, 1.5 · 10<sup>-5</sup> torr~~

13:37 LN<sub>2</sub> auto fill

14:15 Stop pump, ~~3.0 · 10<sup>-8</sup>~~ torr

6/4/2010 13:05 Start pump, 1.0 · 10<sup>-5</sup> torr

14:05 Stop pump

Series 466 Ba 133 ~~1.0 · 10<sup>-5</sup>~~ 1 cm steps from 34.5 cm, 450s

Run 0:	34.5 cm	71.32 Hz / detector
Run 1:	33.5 cm	95.09 Hz
Run 2:	32.5 cm	126.41 Hz
Run 3:	31.5 cm	168.89 Hz
Run 4:	30.5 cm	
Run 5:	29.5 cm	2.7811 Hz
Run 6:	28.5 cm	
Run 7:	27.5 cm	324.53 Hz
Run 8:	26.5 cm	362.31 Hz
Run 9:	25.5 cm	316.24 Hz
Run 10:	24.5 cm	366.14 Hz

Run 10:	23.5 cm	383.59 Hz
Run 11:	22.5 cm	393.12 Hz
Run 12:	21.5 cm	401.73 Hz
Run 13:	20.5 cm	399.89 Hz
Run 14:	19.5 cm	397.82 Hz
Run 15:	18.5 cm	396.27 Hz
Run 16:	17.5 cm	398.91 Hz
Run 17:	16.5 cm	392.99 Hz
Run 18:	15.5 cm	388.24 Hz
Run 19:	14.5 cm	379.93 Hz
Run 20:	13.5 cm	366.18 Hz
Run 21:	12.5 cm	338.09 Hz
Run 22:	11.5 cm	299.65 Hz

6/17/201012:30 LN<sub>2</sub> dewar empty12:45 Start pump,  $6 \cdot 10^{-3}$  torr

12:53 Insert Cs 137 @ 20.3 cm

12:55 Series 467 Cs 137 @ 20.3 cm, 30 min runs13:45 Stop pump,  $7 \cdot 10^{-8}$  torr6/18/201010:35 Start pump,  $6 \cdot 10^{-6}$  torr

Insert Cd shielded Au 241 @ 23 cm

Series 468 Cd shielded Au 241 @ 23 cm, 30 min11:35 Stop pump,  $2.7 \cdot 10^{-8}$  torr

9-

6/19/2010

- 13:40 Start pump  $2 \cdot 10^{-5}$  torr  
 14:02 Stop pump  $4.1 \cdot 10^{-8}$  torr

Series 469 Cs shielded Au 241 @ 23 cm  
 write data, 10 min runs, 6 runs

Series 470 Cs 137 @ 20.3 cm, 30 min runs

6/10/2010

- 13:25 Start pump, ~~3.01~~  $3.5 \cdot 10^{-6}$  torr  
 14:25 Stop pump,  $2.7 \cdot 10^{-8}$  torr

6/11/2010

- 13:10 Start pump,  $1.2 \cdot 10^{-5}$  torr  
 13:33 Restart ~~computer~~ computer for updates

Series 471 Cs 137 @ 20.3 cm, 10 min runs, warming up  
 14:10 Stop pump,  $3.6 \cdot 10^{-8}$  torr  
 14:55 ↵

6/14/2010

12:22 LN<sub>2</sub> & cooler empty  
 76.11/110.9/92.91/91.47

- 12:30 Start pump,  $4 \cdot 10^{-9}$  torr  
 13:30 Stop pump,  $5.6 \cdot 10^{-8}$  torr

6/17/2010

- 12:38 76.55/145.7/113.7/107.5  
 12:42 Start pump,  $3 \cdot 10^{-5}$  torr  
 13:37 Stop pump,  $4.0 \cdot 10^{-8}$  torr

Series 472 Cs 137 @ 20.3 cm

Run 0: first run after start

Run 1: test + 20 V to first 7 det

Run 2: test ↵

Run 3, 4 tests ↵

	V <sub>1</sub>	V <sub>2</sub>	V <sub>3</sub>	V <sub>4</sub>
1	1439.6	1459.6	1489.6	1469.6
2	1372.1	1392.1	1402.1	1402.1
3	1355.4	1375.4	→	<del>1385.4</del>
4	1373.9	1393.9	→	1403.9
5	1401.7	→	→	1431.7
6	1372.6	→	→	1402.6
7	·			→
8	1392.3	→	→	1422.3
9	1382.0	→	→	1412.0
10	1376.1	→	→	1406.1
11	1373.3	→	→	1403.3
12	1443.1	→	→	1473.1

20 runs @ 2 min each, followed by 5 min runs

15:14 76.35 / 148.7 / 116.1 / 109.4

3 runs @ 2 min, turn off 1-6, wait 1530, starting @ #5  
 runs 5-7 normal  
 run 8 turn off HV on 1-6, → turn on HV  
 run 9 - 99

18:26 76.44 / 152.9 / 119.1 / 118.8

18:30 Stop run 99

18:31:00 Start run 100 (cycle 0); start 20 runs @ 2 min again  
 to run 106 (cycle 6) no - change num.  
 in run 107 HV off on det 1, 2, 3, 4, 5, ~~6~~ ← ??  
 run 108 just (seconds) before run started HV back on

6/18/2010

13:18 76.93 / 167.6 / 133.2 / 20.9

Start LN<sub>2</sub> fill

13:20 Start pump  $11 \cdot 10^{-5}$  torr

13:45 LN<sub>2</sub> fill finished

76.84 / 160.7 / 133.5 / 121.1

13:50 Series 473 Cs 137 @ 20.3 cm, normal voltage, cooling down  
10 min runs

14:55 Stop pump,  $4.5 \cdot 10^{-8}$  torr

6/21/2010

12:55 Change LN<sub>2</sub> dewar

76.18 / 111.2 / 93.47 / 92.37

13:00 Stars pump,  $5 \cdot 10^{-3}$  torr

14:30 Stop pump,  $5 \cdot 10^{-8}$  torr

19:35 temps: 76.21 / 112.7 / 93.04 / 92.01

19:35 LN<sub>2</sub> just starts to refill

19:36 stop runs 473 run 468

19:41 LN<sub>2</sub> full

checks breakdown HVs (with source B)

det HV set breakdown

1 1439.6 ~1486

2 1372.1 1402

3 1355.4 ~1397.5

4 1373.9 1407.5

5 1401.7 1434

6 1372.6 1404.5

7 263.9 at 1200-1300V  
still very noisy

8 1342.3 1432

9 1382.0 1410

10 1376.1 1408

11 1393.3 1404

12 1443.1 1488

20:02 end of breakdown HV check (note: "second" scan selected at 20:00")

Note: Cs signals are about at d 600 $\pm$   $\Rightarrow$  temperature of det still increased

20:11 temps: 76.26 / 112.8 / 93.05 / 91.98

34

06/21/2010

20:13:00 start series 474, 20 ms @ 1 min, then 5 min runs  
 run 0 to run 8: regular 1 min runs before HV off

~~20:20~~, run 8 HV off on chs 1, 2, 3, 4, 5, 6  
 → 20:21:30

20:22:34 all HV on again

20:22:40 run 9 with HV on on all channels

end run 17 manually close to 60 sec, start again to extend 1 min  
 sequence to 36 min

6/22/2010

13:12 7624/12.2/42.92/91.85

14:06 Start pump,  $2 \times 10^{-5}$  torr

14:38 LN<sub>2</sub> has just been blown out of inner dewar  
 stop series 474 at run 248

present HV	load Oct 07-09	not 20K $\rightarrow 15V$
1 1439.6	1431.1	1419.6 1424.6
2 1372.1	1359.0	1352.1 1357.1
3 1355.4	1348.6	1335.4 1340.4
4 1373.9	1361.6	1353.9 1358.9
5 1401.7	<del>1391.6</del> 1391.1	1386.7
6 1401.7 1372.6	1358.4	1367.6
7 1372.6 263.9	1454.2	300
8 1392.3	1403.1	1377.3
9 1382.0	1372.4	1367.0
10 1376.1	1365.0	1361.1
11 1373.3	1358.3	1358.3
12 1443.1	1455.4	1428.1

14:43 start LHe filling

14:45 start series 475

76.71 / 111.9 / 92.9 / 91.66

14:47 stop; delete runs

14:55 start [again] series 475 with HV -15V all channels except 12  
5 min runs

14:56 71.42 / 111.9 / 92.88 / 91.41

15:14 1 K52

15:17 3.7 K52 38.02 / 111.8 / 92.75 / 89.19

15:30 3.7 K52 14.73 / 111.7 / 92.46 / 86.94

15:48 stop LHe fill, 13.60 / 111.7 / 92.24 / 86.27

15:51 Stop pump  $4.4 \cdot 10^{-8}$  torr

16:00 12.84 / 111.7 / 91.48 / 85.28

16:44 note: disk was disabled after a few runs,

17:16 12.50 / 111.8 / 90.77 / 84.71

18:24 12.19 / 112.0 / 89.95 / 83.94

6/23/10

• LHe level meter indicates no LHe in volume.  
Resister chain confirms it as well.  $R = 1219 \Omega$

• Computer was off - maybe due to power glitch  
last night (from storm)

$$P_{ion} = 1.1 \times 10^{-5} A$$

10:55 noticed that HV had been ~~been~~  
restored to values (-15V col.) on page 34  
have profile, HV off, insert LPS

11:08 start Series 476: 40 1 min runs, then 5 min runs (~~then 24~~)  
then  $\infty$  10 min runs

run 0 HV off

11:09 run 1 HV ramping up

run 2 HV just up

11:12 temperature 11.18 / 113.3 / 84.96 / 79.14

11:15 resume LHe

11:32 LHe full

11:37 stop run 27

11:37 start again

Magnet ramping up) now at 110 A  
amp/sec jet rate usual 6 A/m.  $\rightarrow$   
now 40 A 2 A/m.

11:39 Heate on magnet

11:40: Nit set point  $\rightarrow$  ramp during new m 2

11:44 LN<sub>2</sub> filling start during new m 6

11:47 end LN<sub>2</sub>

11:48 ~~Remove~~ rod with source got pulled in

11:53 remove rod

11:55 Starts pump  $3.0 \cdot 10^{-7}$  torr

12:22 Magnetic field @ 110 A

12:33 insert source to 20.3 cm on new 55 rod

12:34 Stop series 426 at  $t = 42$

12:35

Start new Series 427

12:36 <sup>4</sup>He level reading still "full"

13:05 Stop pump  $3.5 \cdot 10^{-8}$  torr

13:31 <sup>4</sup>He level @ 90%

15:06 stop m 26 note: 10 min runs were triggering  
on ch 11 (m 23 to 26)

15:08 ~~start~~ resume with regular 10 min runs with  $\rightarrow$  27

15:31 <sup>4</sup>He level @  $\approx 80\%$

16:00 <sup>4</sup>He level @  $\approx 70\%$

temp: 8.16 / 112.0 / 83.31 / 77.31 magnet as  
17.23 8.17 / 112.1 / 83.22 / 77.30 110 A

17:27 start ramping down magnet

17:30 8.17 / 112.1 / 83.26 / 77.31  $\sim 90$  A

<sup>4</sup>He  $\sim 60\%$

17:32 Quench  $\rightarrow 0$  V He boiling off

17:34 He exhaust is decreasing

17:38 11.24 / 112.2 / 84.18 / 78.29

He level still  $\approx 60\%$   
 19:26  $\sim 30\%$  3.740652

20:21 He at 24%

11.31 / 112.5 / 84.07 / 78.11

(6/24/10) •  $T_{4K} = 14.83$  & LHe meter reads 0%

07:10 • It looks like the LHe is empty again.

09:30 • Got He cylinder from Tom (C317)

09:45 •  $T_{4K} = 23\text{ K}$

• start LHe fill.

10:20 • Filled to  $\approx 85\%$  before dewar ran out.

10:30 • Set magnet "Set Rate" to 3 Amp/min rather than the usual 6 A/min. This may help the glitch encountered yesterday during the ramp down of the magnet.

10:47 11.25 / 111.7 / 83.16 / 72.41

locking at centroids of series 477 from ~110 to ~143  
 ( ~5:10 to 10:57 today )

det 7 is garbage as expected

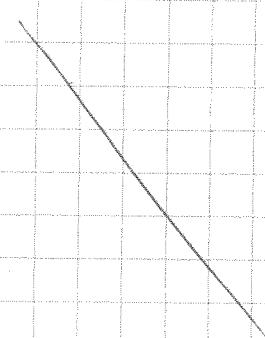
det 9 makes jumps (down) every few hours (as seen earlier)

Others all still have steady rise

587 to 595 for # 1, 3, 12 ;  $8\Delta t = 1.3\%$  in  $5\frac{1}{2}$  h.

515 to 532 # 10 ;  $17\Delta t = 3.2\%$  "

11:06 stops series 477 run 145



set HV to normalize 660 keV peaks to  $\sim \cancel{600}$  560 (85% of peak)  
 (this leaves room for gain drifting up, and for field on later)

det#	port#	$\Delta$ HV	HV now	now	center	DHV	now	center
1		$\sim 143$						
1	594.2	-1.3V	1424.6	1423.3	572.4	-0.7	1422.6	570.2
2	537.4	+1.0V	1357.1	1358.1	571.1	-	✓	571.7
3	596.5	-1.5V	1340.5	1339.0	573.2	-0.8	1338.2	572.1
4	589.1	-1.1V	1358.9	1357.8	570.5	-0.3	1357.5	559.4
5	561.5	-0.1V	1386.7	1386.6	560.4	-	✓	562.8
6	568.5	-0.4V	1357.6	1357.2	562.0	-0.1	1357.1	559.5
7	—	—	300	—	—	—	—	—
8	575.2	-0.6V	1377.3	1376.7	574.7	-0.2	1376.5	572.4
9	576.5	+1.4V	1367.0	1368.4	556.2	+0.2	1368.6	571.7
10	532.6	+1.1V	1361.1	1362.2	558.6	+0.1	1362.3	560.8
11	537.6	+0.9V	1358.3	1359.2	559.4	—	✓	558.5
12	595.5	-1.4V	1428.1	1426.7	571.1	+0.6	1426.1	560.3

11:23 new SERIES 478, with HV; 2 min rms

[Note DAG settings for "monitor" rms for cosmic rms  
 - write data files: no yes  
 - sync off on  
 - reset NCA on on

11:57 start new SERIES 479

event date to disk, 10 min rms

Cs source at center of deflector, but LHe cooled  
 magnet off

temp: 11.23 / 111.3 / 83.10 / 77.3C

run 0 is garbage

NOTE det 11 signal is TEE'd off to inputs of Amps Det 485  
 probably input terminated into 16Ω, so we would lose 5%  
 of signal

## Procedure for synchronous single trigger

Set ini file to use "Dexx Octopus Cal" for first run.

- ① In ini file, set:

Gage card ini fileroot 1 = "<sup>initial</sup> Dexx Octopus Cal"

Number of cycles in state 1 = 1

Aquire time in State 1 (seconds) = 300

Gage card ini file root 2 = "<sup>initial</sup> Dexx Octopus Sync"

Number of cycles in state 2 = 1

Aquire time in State 2 (seconds) = 3600

Number of cycles in state 3 = 0

- ② On the detector that will trigger the DAQ, insert the T barrel ~~into~~ between the cable from the pre-amp and the cable to the DAQ.

- ③ Make sure DAQ is ~~not~~ set to synchronized.

- ④ Begin run.

- ⑤ Wait until the first run is completed, then set "Stop Aquire" to yes.

- ⑥ The run will then stop when it is completed.

- ⑦ Move T barrel to next desired detector. Repeat from Step 4. Be sure to set "Stop Aquire" to no.

Detectors used for CsI37: 1, 5, 9 (series 453)  
 " Co 57 : 2, 6, 10 (456)  
 " Ba 133 : 3, 11 (461)

we will do now 11, 5, 1 for 137Cs

40

13:08 (start series 480)

external trigger detector 11 (run 1) 60 min  
internal all alert (run 0) 5 min.  
position of source: 20.45 cm

14:14 end of run

temp: 11.25 / 112.2 / 83.03 / 77.39

14:16 (start series 481)

2 min runs, not to event file to monitor gain  
while magnet will be ramped up at 3 A/min. (instead of normal 6)  
~14:15 Start pumping on isolation vacuum.

magnet fill level at 20-25%.

14:20 Manual LN<sub>2</sub> refill

14:23 LN<sub>2</sub> fill stopped

14:24 Start pump,  $1.2 \cdot 10^{-6}$  torr

14:26 start ramping up magnet, run 4

14:45 magnet @ 55 A

temp 8.59 / 112.2 / 82.35 / 76.64

something strange; peak counts are rather dissimilar  
for different detectors

15:17 Stop pump,  $8 \cdot 10^{-9}$  torr

15:25 Insert new drive, move Herbert's - maybe leave folder on new drive

15:26 Series 482 Cs 137 @ 20.45 cm, write data

10 min runs

16:12 He leak @ ~~10-15%~~

16:29 Series 483 Cs 137 @ 20.45 cm, write data

Run 0 : Trigger all, 5 min

Run 1 : Trigger on 11, 60 min

Run 2 : Trigger all, 5 min

Run 3 : Trigger on 5, ~~5 min~~

Run 4 : Trigger all, 5 min

Run 5 : Trigger on 1, 60 min

1293.85 s

~~Set to~~

17.42 LHe level &lt; 5%

18:15 Fill LHe  
Series 483 cont.18:29 Run 4: Trigger on 5, ~~2400s~~ 1400s (205,000 evt)

scaler shows: 52552 in 100 sec 526 Hz

later 4534.82 Hz

DAG 155.8 Hz each card

Note: the discr. level increased from 1.5 to 2.0 for  
 about 15 sec during run  
 (at 2.0 it 119.1 Hz)  
 at 1.5 419.8 Hz

external trigger threshold reading on SCA no par: 1.50  
 for det 5 this is too low

off line	1.6	: 171.1 Hz	1.3
	1.7	: 148.7 Hz	1.21
	1.8	: 127.9	) 20
	1.55	: 187.3	

<del>Set to</del>	1.60	182.1
use	<u>1.70</u>	143.7
	3.0	108.0

run 5 new threshold for external trigger: 1.70 instead of 1.50

scaler 100 sec : 159.12 Hz

events @ 191.60 : 17400  $\approx$  90.8 Hz

This translates to  $\sim 43\%$  dead time or 211 Hz DAG capable  
 previous threshold was  $\sim 65\%$  dead time or 238 Hz DAG capable  
 for coincidences

Run 6 Trigger on all, 5 min 5 149.6 Hz scaler  
Run 7 Trigger on 1, 60 min 5

20:11 7.813/112.5/82.02/76.98 magnet ~~on~~ off  
 342600 evt 3601 sec  
 scalers (100 sec) 142.78 Hz

Continued

20:29 ~~start zeros~~ 483 for monitor magnet ramp down  
2 mins

mr 8 field  $\rightarrow$  ~1 min  
mr 9  $\rightarrow$  2 mins

20:32 heater on mr 2 @ 60 sec start ramping down  
at 3A/min

magnet ramping down

ramp down - stuck at 109.26 A (actually, I think it came back  
up again...)

22:40 108 A

22:43 100 A  
 $\rightarrow \sim 80$

20:50 108.29

20:53 100

20:55 94

20:56 90

89

88

87

85

84

83

82

81

80 (21:00)

79

78

21:02 go to set point 110 A

heater off

zero

hold

set point  $\rightarrow$  110 A

heater on 05:45

21:06:37 zero

21:10 100

95

21:13 90 A

85 A

80

79  $\rightarrow$  106.1

go back to set point 110 A

I suspect short heater not working properly  
power off

... miss cable

21:30 start ramping down as

21:35 93 A / 90 A / 85 / 82  $\rightarrow$  105 / 100 / 90 hold @ 21:44

22:09 find at 104.9 A, heater still on, heater output light still on  
press set point  $\rightarrow$  110 A

heater off / wait / zero / hold

He level:  $\sim 92\%$

22:14 stop mr 59

prepare for no-source date

22:18 7.892 K

~ 22:18 remove source file

remove source

replace stiks to dot, orth. 20.4 mm

22:19 7.891 112.5 / 82.12 / 77.10

22:22 start new SERIES 484

internal trigger all detectors ( .. Cal.ini )

no source

magnet on

~ 33000 events in 101 sec  $\Rightarrow$  ~ 330 est/sec

scaler on det 1 : 100 sec = 752 = 7 est/sec

D&Q rate too high for no source, trigger too low?

increase thresholds by 1% each

det	old	new
1	4	5
2	3	4
3	5	6 7
4	3	4
5	4	5
6	3	4 5

det	old	new
7	3	4
8	3	4
9	2	3
10	4	5
11	4	5
12	4	5

run 0 : old thresholds

~~run 1~~ : event files deleted

run 2 : no event files on disk

100 sec : 26200 / 5600 esth 262 Hz / 52 Hz

~~run 3~~ : threshold det 3  $\rightarrow$  7 ; det 6  $\rightarrow$  5

85 sec 8800 / 4600 104 Hz / 54 Hz

~~run 4~~ : det 3 threshold back to 6

27 sec 7200 / 1000

~~run 5~~ : det 3 thr  $\rightarrow$  7 , det 6 back to 4

31 sec 3800 / 1600

~~run 6~~ : det 3 thr = 7 det 6 thr = 5

delete Run, 1 to 6

22:44 start event data run #1 with new threshold.

23:34 ~ 75% LHe

key 7.894 / 112.4 / 82.17 / 77.14

44

06/24/2010

23:45 end run 6 of sequence 484 (605 sec 23200/17000 events)  
 (no source, all detector internal trigger, increased threshold)

23:47 run 7 Cs source outside of magnet  
 rotate every 2½ min  
 beam right  
 bottom  
 top  
 left

23:58 end run 7 ~~792 sec 88,700/69,000 events~~  
~~764 88,800 / 70,000 events~~  $\approx 116/92 \text{ Hz}$   
remove Cs source to cabinet

06/25/2010

00:02 start new SERIES 485no source  
magnet on

external trigger for run 1 (60 min)

run 0: internal trigger for run 0 (5 min) @ 136 sec / 500V / 3600  $\approx 37/26 \text{ Hz}$ 00:07 run 1 external trigger detector!

scaler for external trigger: 694 / 100 sec  $6.94 \text{ Hz} \pm 0.26$   
 7553 / 1000 sec  $7.55 \text{ Hz} \pm 0.09$   
 1499 / 200 sec  $7.50 \text{ Hz} \pm 0.19$

end run 1 3606 sec and 24,400/24,400 events

~~run 2 move T from signal 1 to signal 5 detector~~  
~~(T splits signal to discriminator for external trigger)~~

run 2: all signals trigger 5 min run  
source at bottom → to mainly calibrate ± 5 (also ± 1)

~~run 3: remove source~~

~~all signals trigger internally 5 min run~~  
 300 sec 42400/30200 events

01:17 run 3: same, but without source 5 min  
 all signals trigger internally  
 external scales 200 sec:

01:22 run 4 external trigger det 5

200 sec:	2953 events	$= 14.8 \pm 0.3 \text{ Hz}$	recorded
300 sec	34481 events	$11.5 \pm 0.06$	$\sim 3260 \text{ sec}$
			$= 9.68 \pm 0.05 \text{ Hz}$

06/25/10

02:22 end run 4. 3600.5 sec 36,000 / 36 runs 2.6

move trigger from det 5 to det. 11  
place source on top of magnet

02:24 start run 5 - with source

- det 11 signal split to discriminator
- all detectors internal trigger 5 mins

LHe @ 30%

went from ~60% to 30% with less than 2 hours ( $\approx \frac{1}{2}$ )  
rate  $\approx 39157/128\text{sec} = 30.6\text{Hz}$  since det 11 with source

02:30 start run 6 - no source

- all detectors internal trigger 5 min run

DAQ event rate 207/sec  $7800/5600 = 38.8/27.9\text{Hz}$

det 11 rate scalers: 200/sec 1859 = 9.3 events/sec

02:36 start run 7: 60 min external trigger detector 11

02:42 LHe  $\sim 28\%$

03:34  $\sim 23\%$

scalers 3622.6/sec 36321/arts 10.03 Hz

end 3:36 DAQ 3226.3/sec 28000/28000 arts 8.68 Hz

03:41 insert  $^{137}\text{Cs}$ , which removed at 23.4 cm

03:42 temp 7.892 / 112.1 / 82.21 / 77.20

start refill LN<sub>2</sub>

03:55 start LHe refill

04:01 series 486 start run with source (new threshold 46 L arts), rate  
 $\approx 58.5\text{sec} 124000/120,400\text{ arts} 270/262\text{Hz}$

04:15 end LHe refill level > 100%; still a bit left; Dewar

04:21 start run 1 on SFRIGS 486 first event run  
with  $^{137}\text{Cs}$  source

magnet on

trigger internal all detectors

10 min run

04:24 temps 7.858 / 112.0 / 82.23 / 77.23

04:37 7.853 / 112.0 / 82.25 / 77.26

LHe > 100% (or at least 90%)

10:20 Stop run, delete ~~data~~ & drawing file  
LHe @ 66%

10:32 11.21/111.7/83.55/78.36

10:32 Series 487 Cs 137 @ 20.45 cm, write data

Run 0: Trigger on all, 5 min

Run 1: Trigger on ch 5, 60 min

Run 2: Trigger on all, 5 min

Run 3: Trigger on ch 1, 60 min

~~12:00~~ Series 488 Cs 137 @ 20.45 cm, write data, 10min, 6 runs

13:02 LHe @ 25%

13:00 11.27/111.9/83.53/78.32

13:50 source removed, cool placed back:-

Series 489 No source, write data, 10min, 7 runs, 20.45 cm

Run 6: Strong Cs source outside

13:57 temp 11.31 / 112.0 / 83.53 / 78.34

14:30 LHe @ 15%

11.37/112.2/83.55/78.35

15:00 Change trigger level for 586<sup>V</sup> to 690  
from 5%

Series 489 Run 6

15:15 Series 490 No source, 20.45 cm, write data, ~~trigger etc~~

Run 0: Trigger on 1, 60 min 7.760 Hz

Run 1: Trigger on 5, 60 min 8.925 Hz

Run 2: Trigger on 11, 60 min 9.191 Hz

Run 3: Trigger on all, 10 min

15:30 LHe @ 7.5-10%

17:30 LHe empty

11.80/112.8/83.69/78.43

17:35 Change LN<sub>2</sub> dewar

18:18 12.03/112.9/83.72/78.45

still 06/25/2010

~~18:51 (new SERIES 491)~~

~~to monitor warmup NO; no source ...~~

19:24 temps: 12.57 / 113.1 / 83.75 / 78.47

19:21 actually, to monitor temperature, continue series 491

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13:28 81.18 / 113.2 / 92.63 / 91.56

13:32 Start pump,  $4 \cdot 10^{-4}$  torr

13:35 Start filling inner dewer w/ LN<sub>2</sub>

13:55 Stop series 491

13:57 Returns for updates

13:58 Stop filling inner dewer

14:06 76.85 / 113.0 / 92.68 / 91.13

~~14:08 begin LN<sub>2</sub> fill~~

14:18 Change LN<sub>2</sub> dewer, begin fill

14:24 Fill stopped

14:30 Stop pump,  $5.2 \cdot 10^{-3}$  torr

14:38 Series 492 Cs 137 @ 20.3 cm, 900 s runs  
76.29 / 112.7 / 92.63 / 90.92

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13:43 Change LN<sub>2</sub> dewer

76.25 / 112.8 / 91.90 / 90.30

13:55 Start pump,  $9 \cdot 10^{-6}$  torr

17

48

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14:00 Voltage calibration, 5 min runs after 92

Det	$V_0$ (run 92)	Peak	$\Delta V$	$V_1$	Peak	$\Delta V$	$V_2$	Peak	$\Delta V$
1	1422.6	531	12.2	1434.8	530	4.3	1439.1	528	628 1.2
2	1358.1	555	14.4	1372.5	633	1.0	1373.5	604	-0.1
3	1338.2	401	11.5	1349.7	544	4.6	1354.3	617	1.6
4	1357.5	366	13.7	1371.2	588	2.7	1373.9	654	0.3
5	1386.6	375	13.2	1399.8	582	3.0	1402.8	657	0.4
6	1357.1	368	13.6	1370.7	592	2.6	1373.3	655	0.2
7	—	—	—	—	—	—	—	—	—
8	1376.5	348	12.4	1388.9	565	3.7	1392.6	639	0.8
9	1368.6	372	13.4	1382.0	631	1.1	1383.1	665	-0.1
10	1362.3	368	13.6	1375.9	609	1.9	1377.8	660	0.0
11	1359.2	346	14.9	1374.1	630	1.1	1375.2	663	-0.1OK
12	1426.1	345	12.5	1438.6	551	4.3	1442.9	632	1.1
8	—	—	—	—	—	—	—	—	—

Det	$V_3$	Peak	$\Delta V$	$V_4$	Peak	$\Delta V$	$V_5$	Peak	$\Delta V$	$V_{find}$
1	1440.3	654	0.3	1440.6	659	0.0OK	1440.6	654	0.0OK	1440.6
2	1373.4	660	0.0	1373.4	659	0.0OK	1373.4	659	0.0OK	1373.4
3	1355.9	646	0.5	1356.4	657	0.2	1356.6	661	0.0OK	1356.6
4	1374.2	661	0.0	1374.2	661	0.0	1374.2	662	0.0OK	1374.2
5	1403.2	663	-0.6OK	1403.2	663	0.1OK	1403.2	663	0.0OK	1403.2
6	1373.5	661	0.0	1373.5	660	0.0	1373.5	662	0.0OK	1373.5
7	—	—	—	—	—	—	—	—	—	—
8	1393.4	656	0.2	1393.6	661	0.0	1393.6	663	0.0OK	1393.6
9	1383.0	662	0.0	1383.0	664	0.0OK	1383.0	664	0.0OK	1383.0
10	1377.8	661	0.0	1377.8	660	0.0	1377.8	660	0.0OK	1377.8
11	1375.2	663	-0.1OK	1375.2	663	0.0OK	1375.2	663	0.0OK	1375.2
12	1444.9	608	2.0	1443.8	650	0.4	1444.2	657	0.2	1444.9

4:50 Scop pump,  $5 \cdot 10^{-5}$  torr Co-575:20 Insert Pb shielded ~~1373.5~~ @ 34.5 cm  
76.18/112.7/91.87/90.285:25 Series 993 1b shielded ~~1373.5~~ @ 34.5 cm, 10 min runs  
Co-57

6/30/2010

Co -57

13:30 Stop series 493, change trigger for ch 5,0 from 6% to 5%

13:35 Series 494 Pb shielded ~~8 cm~~ Stepping through detector  
1 cm steps from 34.5 cm, 10 min runs

Run 0: 34.5 cm 44.50 Hz/det

Run 1: 33.5 cm 87.69 Hz/det

Run 2: 32.5 cm 257.52 Hz/det

Run 3: 31.5 cm 271.39 Hz/det

Run 4: 30.5 cm 274.30 Hz/det

Run 5: 29.5 cm 268.03 Hz/det

Run 6: 28.5 cm 113.35 Hz/det

Run 7: 27.5 cm 268.14 Hz/det

Run 8: 26.5 cm 270.44 Hz/det

Change run times to 450 s

Run 9: 25.5 cm 273.36 Hz/det

Run 10: 24.5 cm 271.60 Hz/det

Run 11: 23.5 cm 270.70 Hz/det

Run 12: 22.5 cm 277.25 Hz/det

Run 13: 21.5 cm 276.46 Hz/det

Run 14: 20.5 cm 273.46 Hz/det

Run 15: 19.5 cm 276.19 Hz/det

Run 16: 18.5 cm 279.35 Hz/det

Run 17: 17.5 cm 274.24 Hz/det

Run 18: 16.5 cm 277.63 Hz/det

Run 19: 15.5 cm 272.35 Hz/det

Run 20: 14.5 cm 262.98 Hz/det

Run 21: 13.5 cm 253.84 Hz/det

Run 22: 12.5 cm 20.35 Hz/det

Run 23: 11.5 cm 43.22 Hz/det

13:37 Start pump  $2 \cdot 10^{-5}$  torr

14:10 Stop pump,  $2.5 \cdot 10^{-7}$  torr

7/1/2010

Weak sources ~~are~~ are 3cm deeper than shielded sources  
with Al rod

13:03 Insert weak Ba-133 source @ 31.5 cm  
76.26/111.6/91.25/89.82

13:10 Series 495 Ba-133 @ 31.5 cm, 10 min runs

13:17 Start pump,  $3 \cdot 10^{-6}$  torr

14:15 Stop pump,  $3.4 \cdot 10^{-8}$  torr

7/2/2010

12:40 Stop series 495

~~Series 496 Ba-133 step through detector~~

12:43 Start pump,  $7.5 \cdot 10^{-6}$  torr

Series 496 Ba-133, Step through detector, 5 min. runs

Run 0: 31.5 cm

173.10 Hz/dec

Run 1: 31.0 cm

195.58

Run 2: 30.5 cm

219.58

Run 3: 30.0 cm

241.79

Run 4: 29.5 cm

260.76

Run 5: 29.0 cm

278.92

Run 6: 28.5 cm

292.73

Run 7: 28.0 cm

297.51

Run 8: 27.5 cm

297.25

Run 9: 27.0 cm

291.10

Run 10: 26.5 cm

281.97

Run 11: 26.0 cm

287.38

Run 12: 25.5 cm

304.24

Run 13: 25.0 cm

316.43

Run 14: 24.5 cm

335.69

Run 15: 24.0 cm

345.31

Run 16: 23.5 cm

350.68

Run 17: 23.0 cm

359.63

Run 18: 22.5 cm

365.22

Run 19: 22.0 cm

367.64

13:55 Stop pump,  $4.0 \cdot 10^{-8}$  torr

Series 496 cont.

Run 21:	21.0 cm	<del>360.52</del>	Hz/det
Run 22:	20.5 cm	375.17	Hz/det
Run 23:	20.0 cm	373.33	
Run 24:	19.5 cm	373.82	
Run 25:	19.0 cm	372.46	
Run 26:	18.5 cm	372.93	
Run 27:	18.0 cm	375.40	
Run 28:	17.5 cm	367.85	
Run 29:	17.0 cm	375.39	
Run 30:	16.5 cm	371.71	
Run 31:	16.0 cm	362.77	
Run 32:	15.5 cm	366.22	
Run 33:	15.0 cm	355.41	
Run 34:	14.5 cm	360.47	
Run 35:	14.0 cm	355.82	
Run 36:	13.5 cm	342.96	
Run 37:	13.0 cm	334.93	16:45 change LN <sub>2</sub> dewar
Run 38:	12.5 cm	319.94	
Run 39:	12.0 cm	314.40	
Run 40:	11.5 cm	283.98	
Run 41:	11.0 cm	264.06	
Run 42:	10.5 cm	237.25	
Run 43:	10.0 cm	215.66	
Run 44:	9.5 cm	187.74	
Run 45:	9.0 cm	161.10	
Run 46:	8.5 cm	144.62	

17:38 Insert Pb shielded Br-83 @ 34.5 cm  
 76.25 / 112.2 / 91.21 / 80.78

~~17:40 Series 496 Run 47 Pb 34.5 cm, 10 runs~~

7/6/2010

15:00 Start pump,  $1 \cdot 10^{-4}$  torr

15:25 Series 497 Pb shielded Ba-133 @ 34.5 cm, 5min runs

15:55 Stop pump,  $1 \cdot 10^{-7}$  torr

7/7/2010

12:00 Stop Series 497

12:05 Start pump,  $8 \cdot 10^{-6}$  torr

Series 498 Pb shielded Ba-133 stepping ~~through~~ through detector  
5min runs

Run 0:	34.5 cm	4191.24 Hz/dec
Run 1:	34.0 cm	4776.09 Hz/dec
Run 2:	33.5 cm	5445.62 Hz/dec
Run 3:	33.0 cm	6730.63
Run 4:	32.5 cm	7923.44
Run 5:	32.0 cm	8385.85
Run 6:	31.5 cm	8736.20
Run 7:	31.0 cm	9088.31
Run 8:	30.5 cm	9333.58
Run 9:	30.0 cm	9488.72
Run 10:	29.5 cm	9559.16
Run 11:	29.0 cm	8956.57
Run 12:	28.5 cm	8977.39
Run 13:	28.0 cm	9344.68
Run 14:	27.5 cm	10065.91
Run 15:	27.0 cm	10224.72
Run 16:	26.5 cm	10339.59
Run 17:	26.0 cm	10413.60
Run 18:	25.5 cm	10432.37
Run 19:	25.0 cm	10486.24
Run 20:	24.5 cm	10496.02
Run 21:	24.0 cm	10515.31
Run 22:	23.5 cm	10520.77
Run 23:	23.0 cm	10526.40
Run 24:	22.5 cm	10528.74

13:30 Stopping,  $4.8 \cdot 10^{-8}$  torr

Run 25:	22.0 cm	10522.32	H2/He
Run 26:	21.5 cm	10522.06	
Run 27:	21.0 cm	10517.65	
Run 28:	20.5 cm	10478.32	14:48 Auto LN <sub>2</sub> fill Stop 14:53
Run 29:	20.0 cm	10475.30	
Run 30:	19.5 cm	10427.71	
Run 31:	19.0 cm	10380.12	
Run 32:	18.5 cm	10316.05	
Run 33:	18.0 cm	10261.07	
Run 34:	17.5 cm	10167.72	
Run 35:	17.0 cm	10045.83	
Run 36:	16.5 cm	9911.66	
Run 37:	16.0 cm	9715.60	
Run 38:	15.5 cm	9485.41	
Run 39:	15.0 cm	9172.48	
Run 40:	14.5 cm	8851.32	
Run 41:	14.0 cm	8378.77	
Run 42:	13.5 cm	7762.57	
Run 43:	13.0 cm	6957.11	
Run 44:	12.5 cm	5755.56	
Run 45:	12.0 cm	4612.58	
Run 46:	11.5 cm	4419.98	

16:40 Insert Pb shielded Co-57

Series 499

~~RePb shielded Co-57 @ 34.5 cm, 10 minutes~~

7/9/2010

12:25 76.16/112.9/92.11/90.46

12:33 Start pump 5.10<sup>-5</sup> torr

7/9/2010

Series 500 Pb shielded Co-57, stepping through detector  
5 min runs

Run 0:	34.5 cm	43.58 Hz/det
Run 1:	34.0 cm	52.58
Run 2:	33.8 cm	57.88
Run 3:	33.6 cm	59.33
Run 4:	33.4 cm	69.76
Run 5:	33.2 cm	107.27
Run 6:	33.0 cm	149.72
Run 7:	32.8 cm	202.61
Run 8:	32.6 cm	241.01
Run 9:	32.4 cm	251.67
Run 10:	32.2 cm	254.58
Run 11:	32.0 cm	257.97
Run 12:	31.5 cm	262.79
Run 13:	31.0 cm	265.57
Run 14:	30.5 cm	261.92
Run 15:	30.0 cm	267.56
Run 16:	29.5 cm	261.43
Run 17:	29.0 cm	135.82
Run 18:	28.5 cm	114.12
Run 19:	28.0 cm	165.00
Run 20:	27.5 cm	265.33
Run 21:	27.0 cm	269.85
Run 22:	26.5 cm	273.05
Run 23:	26.0 cm	270.08
Run 24:	25.5 cm	267.52
Run 25:	25.0 cm	265.02
Run 26:	24.5 cm	272.53
Run 27:	24.0 cm	268.07
Run 28:	23.5 cm	270.16
Run 29:	23.0 cm	272.80
Run 30:	22.5 cm	269.85
Run 31:	22.0 cm	270.39
Run 32:	21.5 cm	276.45
Run 33:	21.0 cm	267.85
Run 34:	<del>21.0 cm</del> 20.5 cm	271.33
Run 35:	<del>20.5 cm</del> 20.0 cm	270.27

13:14 - 13:22 Auto LN<sub>2</sub> All

Series 500 cont

Run 36:	<del>20.0 cm</del> <del>20.0 cm</del> 19.5 cm	269.99
Run 37:	<del>29.5 cm</del> <del>29.0 cm</del> 29.0 cm	273.00
Run 38:	<del>19.0 cm</del> 18.5 cm	268.41
Run 39:	<del>18.5 cm</del> 18.0 cm	267.21
Run 40:	17.5 cm	270.01
Run 41:	17.0 cm	269.14
Run 42:	16.5 cm	269.77
Run 43:	16.0 cm	268.36
Run 44:	15.5 cm	269.66
Run 45:	15.0 cm	265.16
Run 46:	14.5 cm	259.14
Run 47:	14.0 cm	258.88
Run 48:	13.8 cm	261.17
Run 49:	13.6 cm	258.05
Run 50:	13.4 cm	251.33
Run 51:	13.2 cm	227.02
Run 52:	13.0 cm	190.18
Run 53:	12.8 cm	141.04
Run 54:	12.6 cm	<del>106.69</del>
Run 55:	12.4 cm	82.01
Run 56:	12.2 cm	66.56
Run 57:	12.0 cm	56.74
Run 58:	11.5 cm	42.54

18:20 Stop pump,  $1.1 \cdot 10^{-7}$  torr

7/14/2010

14:33 Start pump,  $1.5 \cdot 10^{-4}$  torr

18:11  $1.2 \times 10^{-7}$  torr

18:12 Lose valve, stop pump

7/15/2010

13:25 Insert ~~Cs~~ Cs137 & Co57 @ 20.3 cm, Co57 1 cm deeper  
 $76.22/112.2/91.79/90.26$

13:26 Series # 501 Cs137 & Co57 @ 20.3 cm, 10 min runs

7/16/2010

12:15 Start series 501

Series 502 Cs137 & Co57 @ 20.3cm, Co57 1cm deeper

10 min runs, write data, 6 runs

13:36 Insert Cs137 &amp; Ba133 @ 20.3cm, Ba133 1cm deeper

13:37 Series 503 Cs137 & Ba133 @ 20.3cm, Ba133 1cm deeper  
10 min runs7/19/2010

13:10 Start series 503

13:13 Series 504 Cs137 @ 20.3cm, Ba133 @ 21.3cm, 10 min runs, write data

14:24 Insert Co57 @ 20.3cm &amp; Ba133 @ 21.3cm

76.16/1130/92.31/90.77

4:25 Series 505 Co57 @ 20.3cm & Ba133 @ 21.3cm, 10min runs4:35 Start pump,  $3 \cdot 10^{-5}$  torr7/20/20101:50 Stop pump,  $5.7 \cdot 10^{-8}$  torr1:55 Stop series 505, manual LN<sub>2</sub> fill1:58 Series 506 Co57 @ 20.3cm & Ba133 @ 21.3cm, ~~10~~, write data

3:11 Restart computer for updates