11/20/12

BSD Setup

- Scintillator will slide in box. Adjusted so it was roughly centered between PMTs
- PMT 7A is ~ 1/8" off the BSD [look at this for trigger tube testing]

— TA, 7B, TB, 6B UNSWITCHED

- Blind tubes installed
  - Unswitched Blank = SIDE A
  - Switched Blank = SIDE B
- Next time bring wrench to tighten nuts
  - Spare washers & Nuts.

—

11/21/12

Changed 6B to same HV as switched tubes. Still unswitched, but provides comparison of switched vs. unswitched

Cal center is 38.5" from table floor, so center our detector there

—

11/20/12

Changed all equipment for european (Swiss) 220V, 50Hz power. It all looks okay.

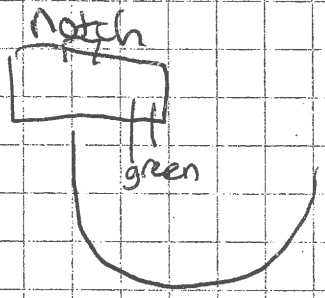
—

11/21/12

Check out BSD Box

Tube	~~Not Switching~~	~~Switching~~
TB:	Good!	
TA:	Good!	
7A:	Good!	
UBlank:	Good!	

Turn supply to 6.64 V, ~2.1 A



Cable lengths - measure time to reflection

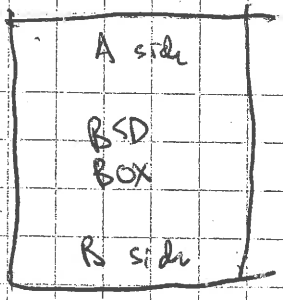
24 Nov 12
SLW

Cable	reflection time	cable length
TB	377.6 ns	188.8 ns
4B	378.4	189.2 ns
2B	375.8	187.9
6B	375.6	187.8
5BLANK	375.0	187.5
5B	376.6	188.3
3B	376.0	188.0
1B	378.2	189.1
LED (no label) (old label: 2A)	376.2	188.1
7A	376.8	188.4
1A	377.0	188.5
TA	373.6	186.8
3A	375.6	187.8
2A	376.4	188.2
6A	376.2	188.1
5A	379.6	189.8
4A	376.4	188.2
UBLANK	375.8	187.9
DONA	127.6	63.8
TAS	128.2	64.1
TBS	125.8	62.9

Turn on Procedure:

1) Turn on the 5V supply 5.75 V 1.98 amps
(watch the current to make sure it does not spike while turning on the other HV supplies. If it does, turn off the HV supply that made the current spike IMMEDIATELY)
2) Turn on the NIM crate
3) Turn on the [redacted] CAMAC crate.
If it overloads power cycle it until it does not.
4) Turn on the silver HV supply
5) Turn on D1 and D2
D1 = 2.78 V
D2 = 3.70 V
6) Then turn on the pulsers

Power off procedure: is the reverse of the power on sequence



Delay from shower to late (neutron) shower integration = t_{S-NI}

Longer of TAS/TBS = t_{TD}, (trigger) Delay from shower to trig in

Signal Delay thru delay cables = t_{SD}, signal delay thru, 188n

Propagation time for trigger formation (from Disc in to CCUSB in where TAS & TBS come in) = t_f = 33ns ± 5ns

Time from CC-USB IL in to pulse firing, (t_{set}) = IL − 10ns

t_{D-CC}

~~Time Delay~~

Want: t_{S-NI} = 400ns

Measured: t_{TD} = 64ns, t_f = 33ns

$t_{S-NI} = t_{TD} + t_f + t_{D-CC} + t_{SD}$

$t_{S-NI} = t_{TD} + t_f + t_{set} - 10ns + t_{SD}$

$t_{set} = t_{S-NI} - t_{TD} - t_f + 10ns + t_{SD}$

$t_{set} = 400ns - 64ns - 33ns + 10ns + 188ns$

$t_{set} = 313ns + 188ns$

$t_{set} = 501ns$

Signal size w/ 50Ω splitter : 726 mV

Signal size w/o 50Ω splitter : 988 mV

$R = \frac{w/}{w/o} = \boxed{0.735}$ → divide all split signals by

150 GeV electrons, 11/27/12

BSD File	UMD File	RX	RY
10-06-30	10~~2~~3324	~~4~~9	22
10-16-35	103327	22	22
10-24-38	104129	21	22
10-30-54	104748	20	22
10-37-41	105433	19	22
10-44-17	110111	18	22
10-51-04	110757	17	22
10-57-16	111469	16	22
11-06-08	112301	15	22
11-14-33	113126	14	22
11-26-34	114329	13	22
11-35-57	115246	12	22
11-42-57	115947	11	22
11-51-06	120759	10	22
11-59-06	121555	09	22
12-06-34	122326	08	22
12-13-28	123018	07	22
12-20-51	123744	06	22
12-31-33	124826	05	22
12-41-27	125818	04	22
12-49-03	~~125620~~ 130553	03	22
12-56-20	131313	02	22
13-03-53	132046	01	22
13-11-25	132814	00	22
13-24-15	134107	22	22
13-~~2~~37-37	135430	23	22
13-46-34	140327	24	22
13-54-30	141122	25	22
14-01-45	141836	26	22
14-08-58	142549	27	22

- bsd_raw_data_11-25-2012-18-41-47.txt
  ↳ muon triggers overnight to ~9:30AM next morning
- bsd_raw_data_11-26-2012-13-06-13.txt
  ↳ test run over lunch. Getting evtnos from UMD
- bsd_raw_data_11-26-2012-16-38-56
  ↳ Running while spills were happening, don't know cal settings

100 1 : 1000 3600 1 : 1000 3600

File	UMD File	Rx	Ry
25-2012--17-59-36	181630.DAT	22	22
18-06-47	182344.DAT	22	22

5000 per

Time correlation

BSD: Nov 26 18:39:53 — UMD: Nov 26 18:37:40
Nov 26 18:40:53 — Nov 26 18:38:40

185302
21-27-17
23-57-26

No file, beam down
214411 22 22
overnight run

Last night, inhibit our trig w/ 20ns delay from pulse 485ns wide

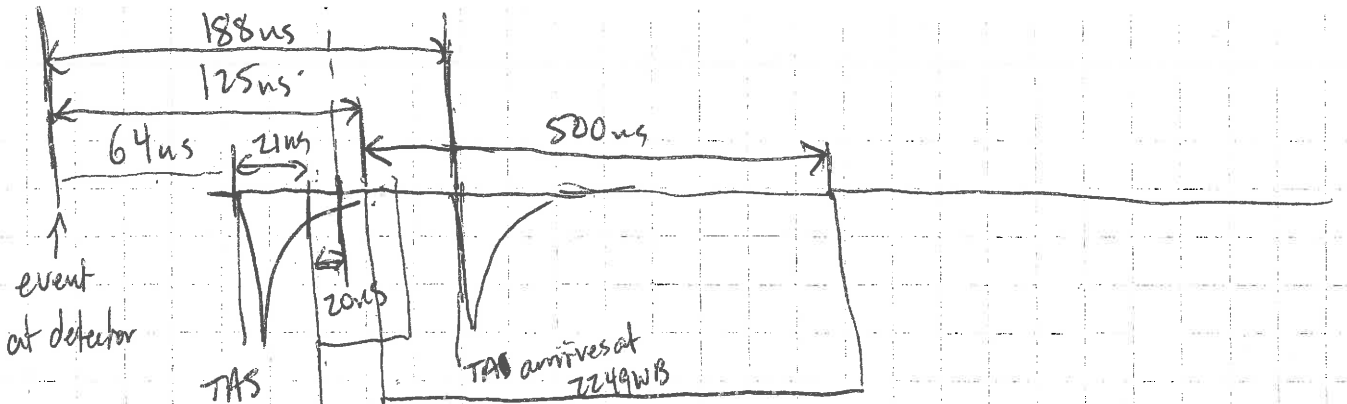
Just before leaving (for night), switch to inhibit on UMD trig.

Overnight this inhibited our latched coinc w/ UMD, so no latch coinc data. (~10AM)

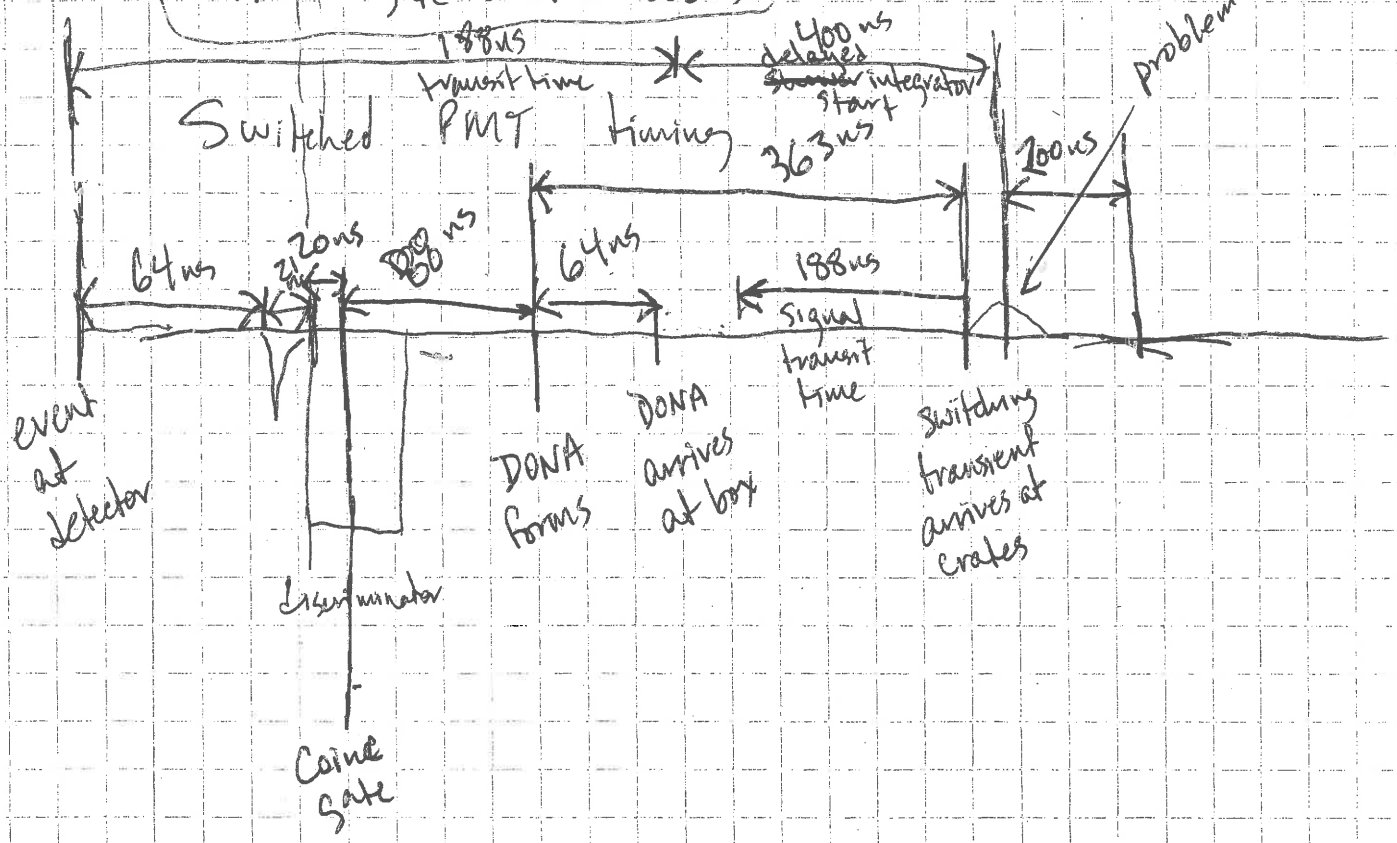
Put in delay cable to inhibit (~60ns), but later realized this doesn't inhibit us from retriggering too early.

Came back from lunch (~1:40PM), changed back to self 4.3 us after coinc, 485 ns wide

HV turned up from 700-750 on unwritten PMTs during Run



2249W-B gate width: 500ns



NOTE: Trigger cable lengths require additional delay over desired 400ns.

Solution: Add 200 ns more to delayed integrator start gate

Set CCUSB to delay = 700

11/26/12

We are seeing lots of SPEs in the late (>900ns) part of the shower.

Plots saved on TBA's personal laptop: /home/tyler/CERN

fig.png – fig16.png

Match pulser height on ~~Ch~~ 7A (on scope) to beam dump height and try again ⇒ still no late

fig7.png – fig32.png

TBA SLN

@ 18-20-57 184309 22 43 ~~Ch~~ Tubb was part way thru run. Wasn't told by UND until midway thru run

23-30-52 → 11:49 PM may have lost beam, yep tripped magnet

~11:58 PM starts again

~1K events/spill

HV Main

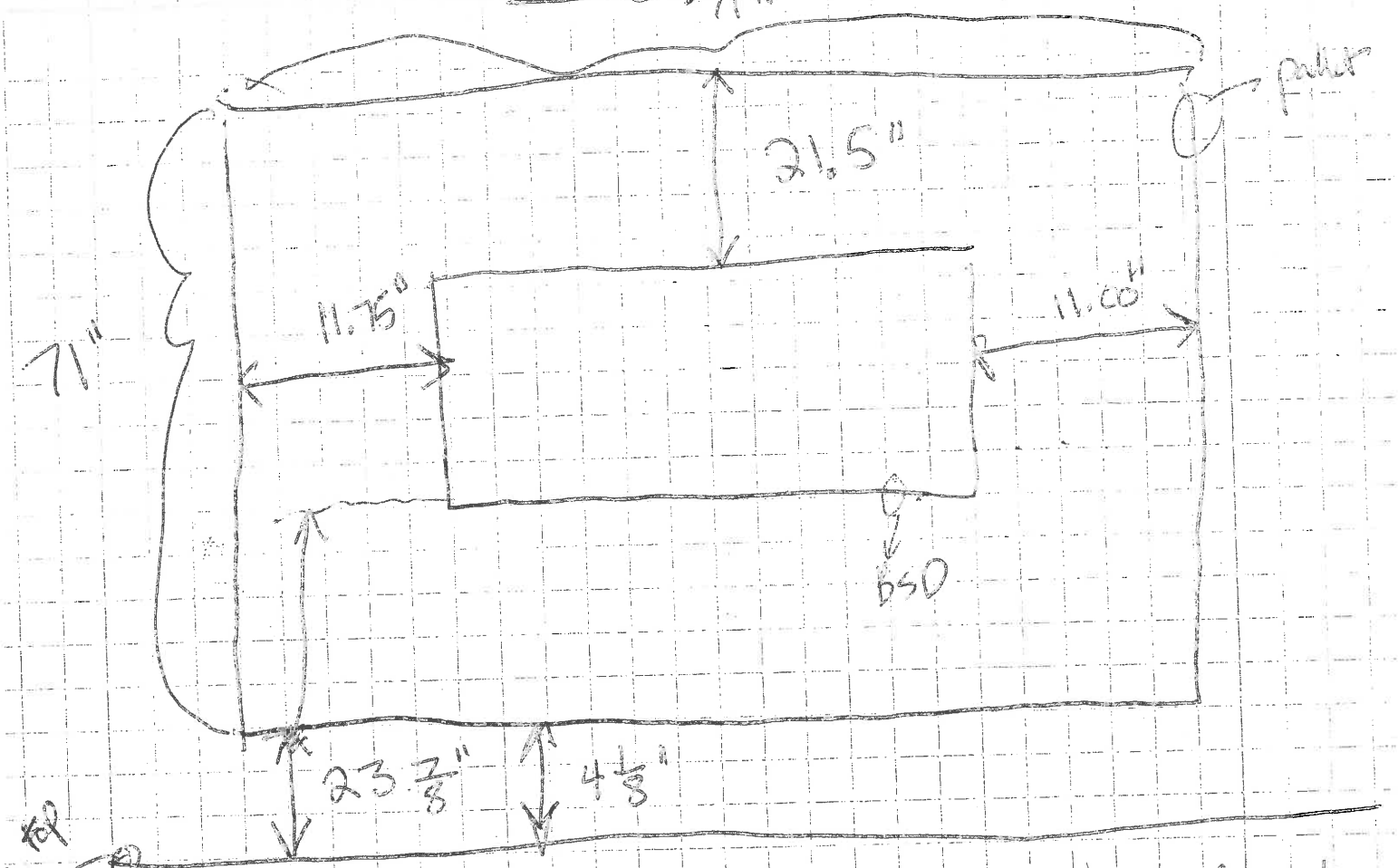
~~Drop HVs to~~ 1100V, 254V = D1, 339V = HVD2

changed to 1800ns integration window 01-16-

400ns

now, delay setting 1500ns, 3600ns wide

Looking upstream from back



5.5" from front of BSD to back of pallet

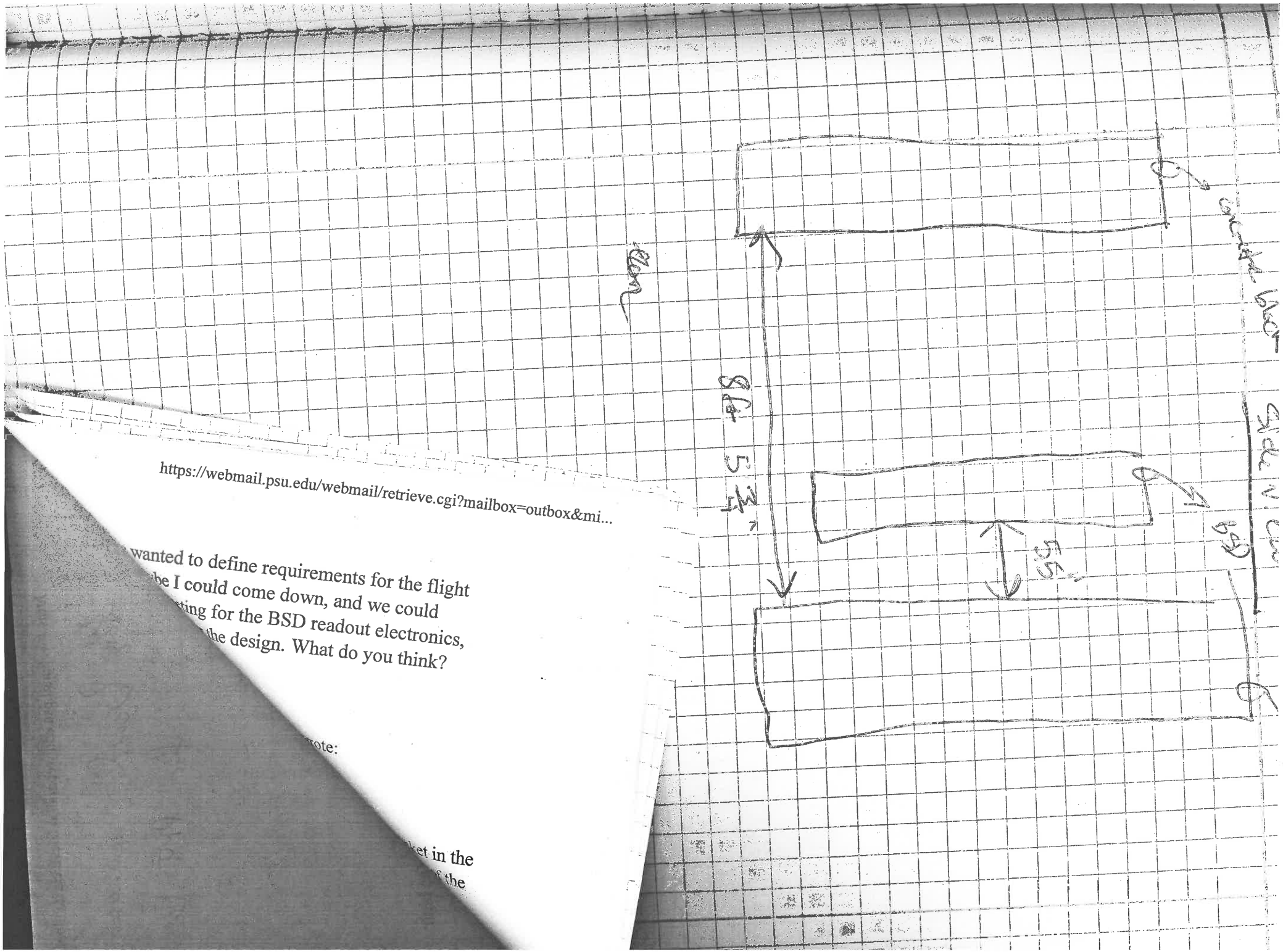
Concrete 16" to left of beam line

https://webmail.psu.edu/webmail/retrieve.cgi?mailbox=outbox&mi...

wanted to define requirements for the flight
be I could come down, and we could
ting for the BSD readout electronics,
the design. What do you think?

rote:

et in the
f the



11/28/12
2 hrs

Pedestal after T- runs

	File	Pulser settings				
	02-35-57	100	1	1500	3600	1 1500 3600
★	02-38-46	"	"	1000	"	" 1000 "
	02-40-17	"	"	1000	1500	" 1000 1500
	02-41-12				900	900
	02-42-33			1500	900	1500 900
	02-43-20			1500	1800	1500 1800
	02-45-15			1500	2700	1500 2700
	02-46-41			1500	7200	1500 7200
	02-49-46			"	10800	" 10800

★ = setting for ē runs of 11/27

- Noted that short times gave peds = 1 or 0 : No G
- Adjusted pedestals to max.
- Retake peds

use for

✓	03-40-21	1000	3600	Ch 2 no
✓	03-41-15	1000	1800	
✓	03-42-02	1500	1800	
X	03-42-36	1500	900	Ch. 2, 5, 6
~	03-43-23	1500	1200	Ch. 2 ~ 2
✓	03-45-18	1000	7400	
✓	03-45-51	1000	2000	
X		1000	1500	
X		1000	1600	
~		1000	1700	Ch 2 [illegible]
X		1500	1000	
~		1500	1100	Ch 2 [illegible]

Map out response curve w.r.t time. Exponential?

Settings		ped file
1000	2000	03-45-51
1000	3000	03-55-23
1000	4000	03-55-43
1000	5000	03-56-01
1500	1200	03-56-30
1500	2000	03-56-58
1500	2800	03-57-23
1500	3600	03-57-58
1500	4400	03-58-20
1000	3600	03-40-21

Concerns
- Spatial scan will make spatial non-uniformities skew time response curve.
- Mitigate by taking data while scanning through center of detector.

ped file

03-43-51

03-55-23

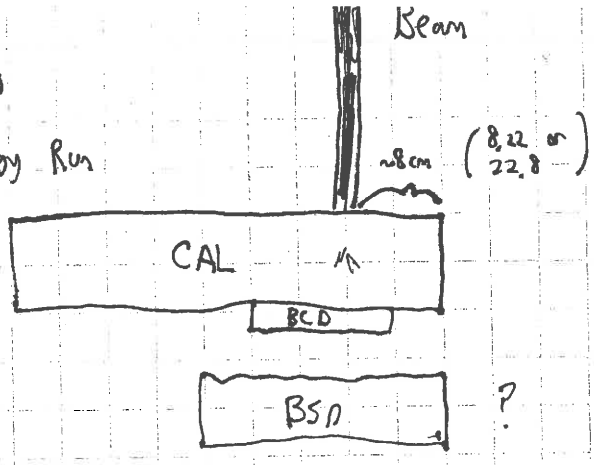
Reads BSD Ped Finder name

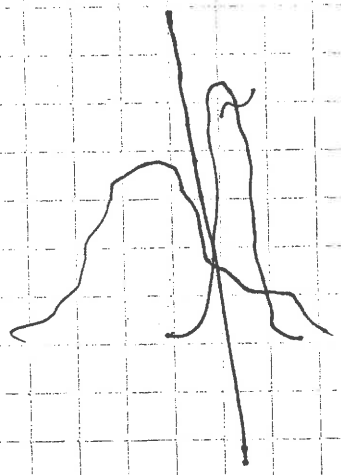
ped_bsd_randata_11-28-2012-03-51_1000_2000

ped_bsd_randata_11-28-2012-03-55-25_1000_3000

10/30

Energy Run





Hadron 1000 shower per 5,000 Triggers
e^- 3500 5,000

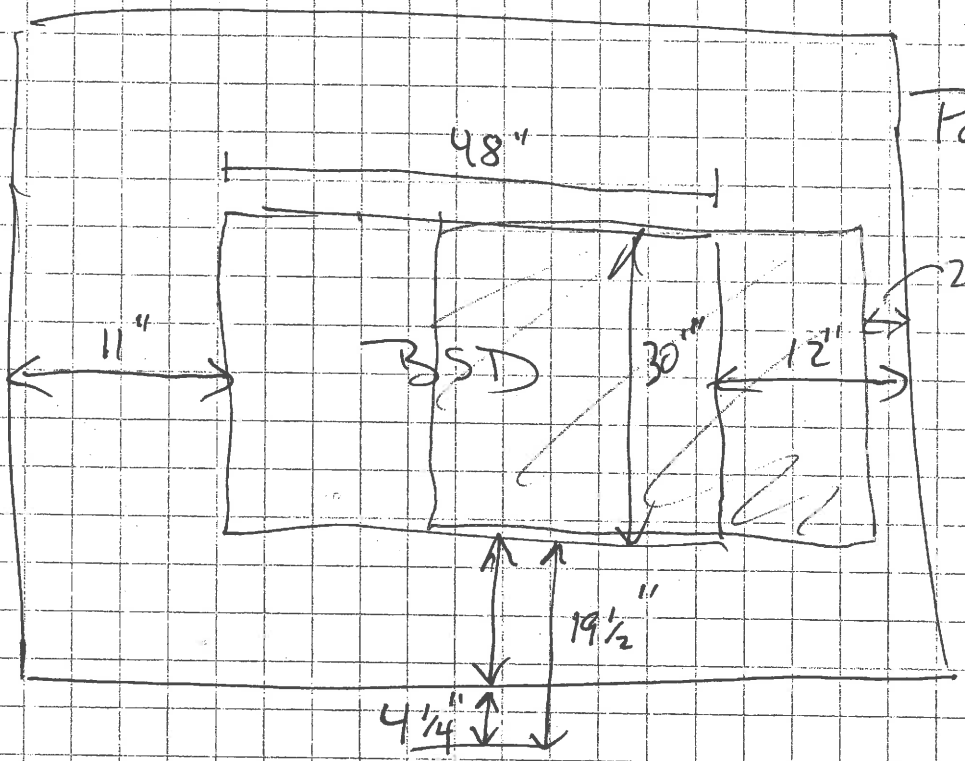
TCD thickness: 1 1/8"

BCD thickness: 1 3/8"

Length 35 1/2" ← Beam

Ht 8 1/4"

Installed 24 3/4 bottom of BCD to edge of pallet



Pallet to back of BSD (upstream) 4.5"

Thickness of BSD : 10.4 cm

View from rear looking upstream

12:51 pm reposition to catch center of beam

Pallet to back of BSD Now 47 7/8"

Notes on Scope Setup for determining exponential decay

0. Timebase set to 1μs/DIV, Delay -5μs, trig = -490mV, neg
1. Make new directory
2. Measure → Measurement Setup
3. Choose P1
   Click On
   Source = Channel is PMT Switched Channel
   Measure = Area
   Markers = on, detailed

   Area → LEAVE UNCHECKED, NOT CYCLIC
   Gate — Markers turns on area your integrating (blue-white lines)
   Want to put in start & End limits Note units is div
   Set Start mark to where integration gate goes
   negative
   Want ~10 points out to 4μs ⇒ 400 ns per division
   Timebase on tell you how far
   Should see P1: area (C3) ≡ Area
   Check signal isn't off screen.
   Accept — Nothing checked

4. Set up Math FCN
   Math → Math Setup
   F1 → Trace on
   Source1 = P1
   Operator1 = Trend

   Zoom = Part charge
   TREND = Values to trend = SET TO Max

You are now set up

Taking data

0 Stop trigger

1 Clear sweeps button on scope

2 When spill ⇒ Normal] on trigger
When spill over ⇒ Stop
DONT CLEAR, just COLLECT

3 Collect 10 spills data

4 File → save waveform
Source = Math = F1
Trace Title = ~~Collected Delay~~ IntStart_IntStop
ex Ip25_Ip65

~~When Satisfied~~

5 Save → adjust timing window
When adjusting the window step upper and lower l
by Increment value (400ns for a 4ns window)

Tyler took data like above for π 350 GeV
Locations: 8, 12
4, 6 starting at end of 2.
NB 2.85 → 3.25 really 2.84 → 3.2

10:20pm End of pion runs

Move BSD to behind CAL frame. Centered on
Cal left-right + up-down.
Distance from pellet rear to upstream side of
29.75"

11/30/12
SLW

FOR JASON to keep him from getting bored while we are gone:

With 150 GeV e⁻'s, CAL in vertical position,

$15 < X_{ribbon} < 25$)

$15 < Y_{ribbon} < 25$)

Start with runs of delay = 1000, width = 2000
Increment width by 200 after 10,000 events (2 runs

until 4000 width.

So

1000	2000
1000	2200
⋮	⋮
1000	4000

X: 30.315 Y: -419.96

12/1/12 to 12/2/12
KCW

Positions of the detector matched with data file names and any other notes on what happened.

Positions of the table

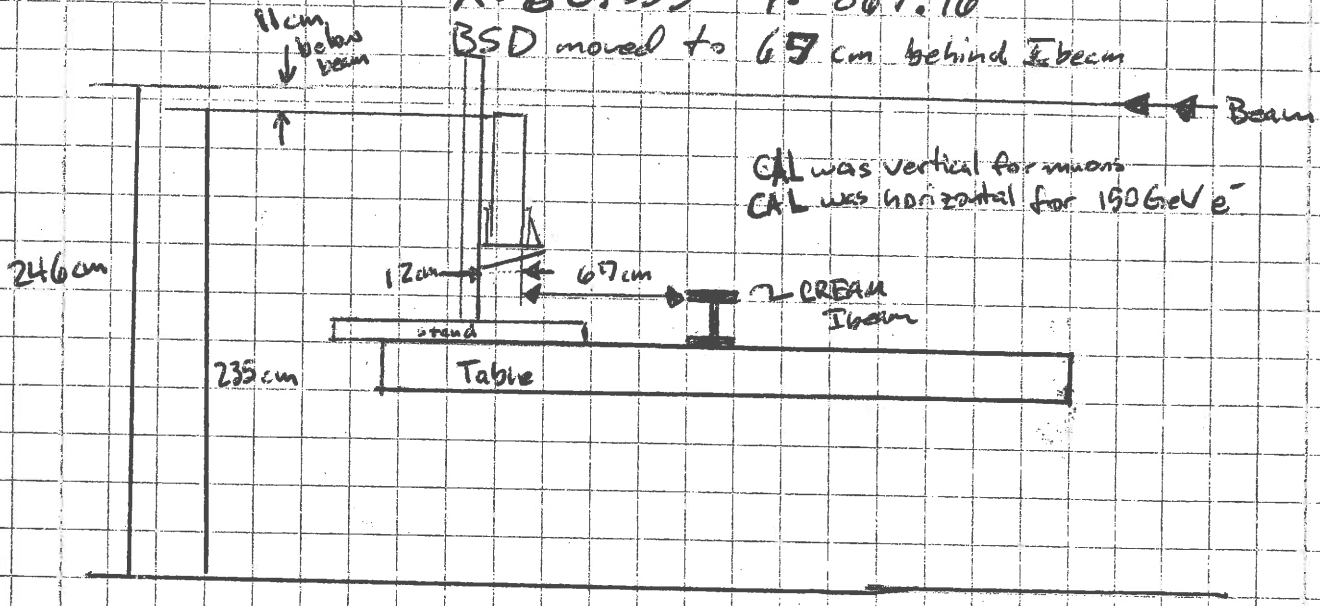
00-54-00 X: 30.390 Y: -373.285

everything else is most likely the same - maybe it is garbage

01-51-29 muons and e^- (150 GeV)

X: 80.339 Y: -867.96

BSD moved to 69 cm behind I beam



Beam centerfral....

00-54-00

X = 30.390

Y = -373.285

22,22

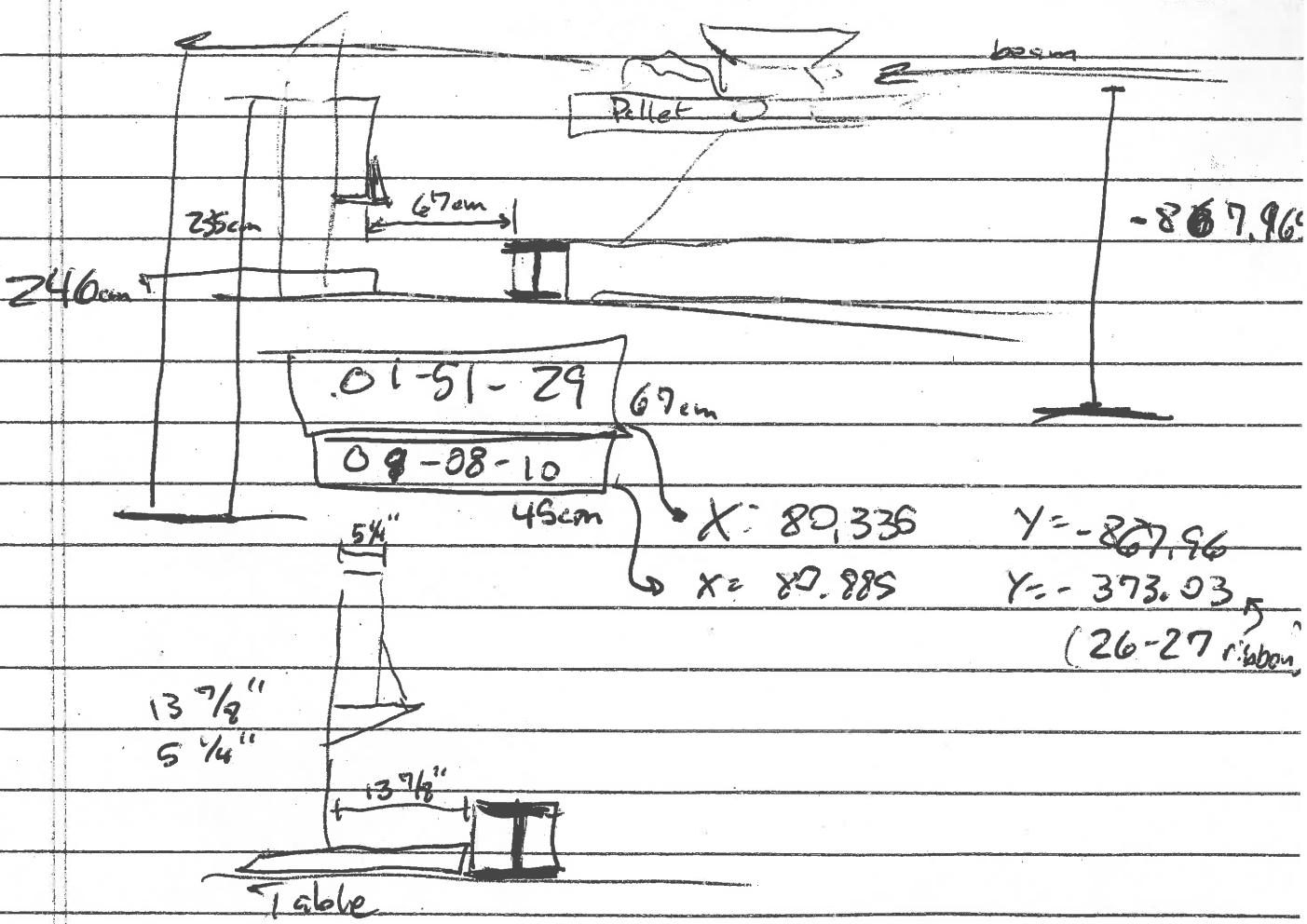
30,315

-489.96cm

$Z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}}$

$Z \sqrt{\frac{p(1-p)}{n}} = \hat{p} - p$

$p = \hat{p} - Z \sqrt{\frac{p(1-p)}{n}}$



11/30/12
SLW

FOR JASON to keep him from getting bored while we are gone:

With 150 GeV e's, CAL in vertical position,

$15 < X_{ribbon} < 25$,

$15 < y_{ribbon} < 25$,

Start with runs of delay = 1000, width = 2000
Increment width by 200 after 10,000 events (2
Until 4000 width.

So.

1000	2000
1000	2200
⋮	⋮
1000	4000

X: 30.315 Y: -419.96

12/1/12 to 12/2/12 KCW

Positions of the detector matched with data file names and any other notes on what happened.

Positions of the table

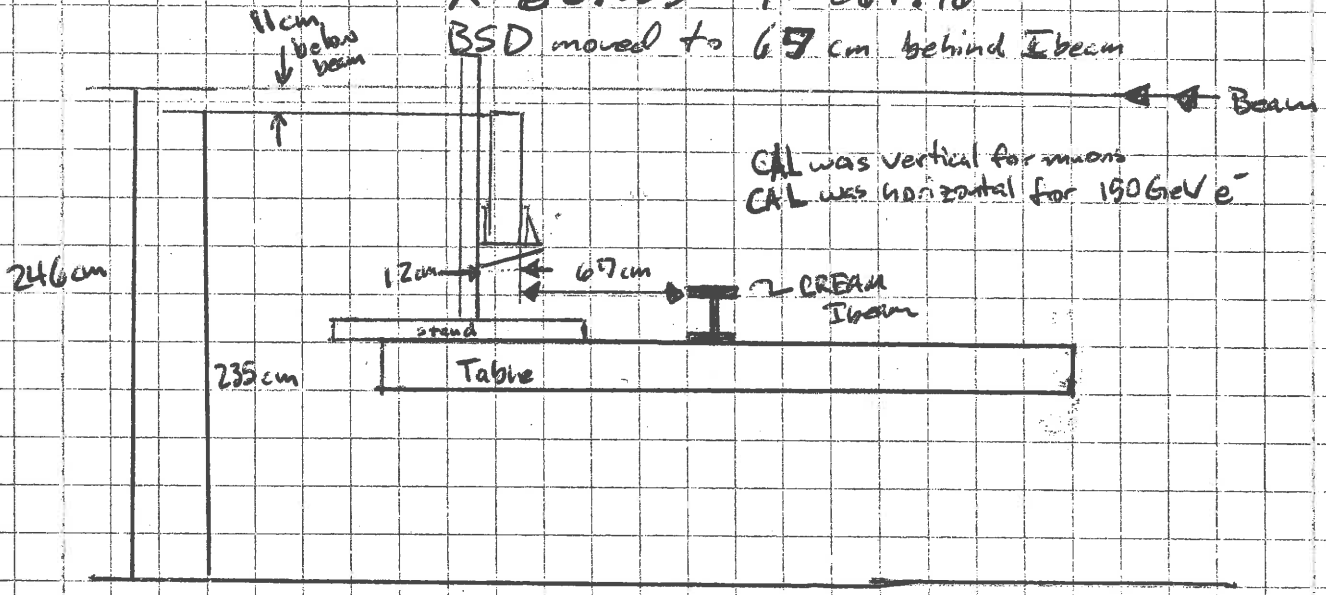
00-54-00 X: 30.390 Y: -373.285

everything else is most likely the same - maybe it is garbage

01-51-29 muons and e^- (150 GeV)

X: 80.339 Y: -867.96

BSD moved to 67 cm behind I beam



12/2 Detector centered @ 29 3/8" back behind cal
for final position scan with CREAM 7 HPDs