

2070/10/16: ~~Friday~~, 20: Tuesday

SND3, SN 19777, in CC mid-point mount. Start at aperture 3, Mylar filter in place.

SND1, SN 27058, in CC gradual scan mount, starts at odds

Helium

9:17AM: Neon into CC, not SEC.

9:38AM: RMR begins (03, 04)

SND1: 100%_s, slow threshold ch2, may be noise

SND3: 120%_s, slow threshold ch27, doesn't look for noise

9:50AM: Power increased to 52kW. (05, 06)

(count rates increased).

9:55AM: Power increased again. (07, 08)

SND1: 350%_s

SND3: 450%_s

10:02PM Power increased again. (09, 10) SND1: 500%_s SND3: 1,000%_s

10:04PM Power raised again. (11, 12) SND1: 750%_s SND3: 1200%_s 62kW

10:09PM (13, 14) Power raised again. SND1: 1100%_s SND3: 2400%_s

10:13PM (15, 16) Power now decreased below its original. SND3 200%_s

10:16PM (17, 18) Power decreased. SND3 125%_s

10:22PM (19, 20) Power decreased. SND3: 60%_s.

10:26PM (21, 22) Power decreased. SND3: 20%_s

10:29AM: (23,24) Even less pow. 20%.

10:30AM: Nothing changed except pow up.. and now I'm getting loads of counts, slow and fast, pre-breakdown! What happened?? I printed a screenshot. I think this is noise.

10:34AM: Scrunched sac shieldy and it went away. Beautiful thermal noise spectrum now.

At first, 200ns noise was shifted right and 400ns noise showed a prominent double-peak. Then I re-shielded and the 400ns double-peak shifted leftward and the 200ns spectrum went leftward.

10:38AM: At this time, Neon into CC is STOPPED and H₂ into SEC begins.

10:43AM (25,26) Hydrogen. NO counts in CC midpoint, 500%. Must be low pow.

10:46AM (27,28) Lowered pressure, & will get X-rays! ~ 35% into ap 3, 500% 200% into 5001, maybe pile-up.

A very neat thing happens 3ms into the 4.5ms pulse!

- o X-rays measured
- o pulse most regular
- o no collapse
- o pags at max

- o Prepared jumps

What happens here??

10:53AM: (29,30) went to lower pressure. CR didn't increase,
and max occurred earlier. Gog to higher pressure
again.

10:55AM: Hmmm... it's not doing it any more.

10:58AM: (31,32) Back at 0.6 mTorr, close to the original value. But
CR is lower, currently $500 \pm 20\%$, $500 \pm 120\%$,
 $24\% \pm 5\%$.
I should open up the aperture, currently qpt.

11:01AM (33) $500 \pm$ now on qpt, nominally $5 \times$ higher.

Looks to be more than that, though. More like 500% , $21 \times$
higher. Why?

Has max at similar place, ~ 3.5 ms m.

Looks like there's a dip at ch67; that could be a good pivot for comparison

Now: $49 \pm 7\%$ above ch50, compared to spectrum 31: $2.8 \pm 1.7\%$ above ch50

Yeah, quite different. Why?

Could be wall emission... maybe go to higher P.

11:11AM (34,35) 70kW, up from 50kW. Much higher count rate! $3,700\%$ $500 \pm$,
into Apt! Not much tail after the O k-d though.
 550% above ch50, 19% above ch75 $\pm 5\%$

11:22AM (36,37) 300A L2, up from 200A L2. CR is now decreased, but that's ok.
Maybe the tail will fill in now.
 950% total, 100% above ch50, 4% above ch75. Hmmm, lower across the
board.

11:30 AM: Do a radial scan of p.l.e.p counts.

38 - 46

7.5 divs: 42%_s

3.5 divs: 15,000%_s

6.5 divs: 2,500%_s

2.5 divs: 14,000%_s

5.5 divs: 10,000%_s

1.5 divs: 12,000%_s

4.5 divs: 10,000%_s

0.5 divs: 10,000%_s

0 divs: 10,000%_s again.

Next! Max @ 3.5 divs = 4.0 cm

Spectrum 34 from 2020/09/29 get 3%_s ± 0.75 above 75ch into qpt

Spectrum 32 from 09/29 get 10%_s above 75ch into qpt
30%_s ± 2.5

2020/09/29 results looking less consistent than I thought. Go to qpt5 to look for a match, then drop back to qpt.

1:10 PM: LN₂ into Flux Conserve, making them Superconducting and cold enough to freeze out water vapor

(47,48) 120%_s into S003 qpt, 15%_s into S001

1:14 PM: (45) Aperture 5 mm. 1,330%_s, 10x more! Inconsistent total count rate, but maybe above a more stringent threshold it looks good, like in September 29 run.

Oxygen line looks much reduced!

1:17 PM (50,51) 60kV, up fan 50kV. 4,400%_s ± 0.5 S003, 120%_s S001.

Oxygen line clearly suppressed.

There's a peak in a weird spot, around CH36. Nothing meant to be there.
There's a peaky section and a tail section

1:29PM: (52) Slow Threshold Zero spectrum: Peak at ch12!
It's meant to be lower!

1:34PM: Conclude run, reshielded. STO peaks at ch7.

(53,54) Peak looks to be ch32 now, moved leftward.

Yes, energy measurement is distorted by noise!

1:39PM (55,56) 250A L2, up from 200A L2. 1040% SDS, low.

Oxygen OK line... back! How can that be?

1:53PM (57,58) STO, 70kW

(59,60) 70kW, up from 60kW. 1450% SDS, 95

2:10PM ~~61-64~~ (62-64) 77kW, up from 70kW, and Kinetics By Blue

L2 current increased from 250A to 30A.

1400% into SDS, 26% above ch75

Yeah, there's serious counts above ch75.

2:18PM (65) APT now, should be ~~4x~~ 5x smaller. 280% into APT, 5.6x smaller

AND significant spectrum above ch75. Good. I was worried about that since reviewing 9/23, spectra 32 fsc.

5% above ch75. Confirmed!

2:28PM (66,67) APT now, 0.67mTorr, up from 0.55mTorr. 1600% SDS, up from 1550%
lower pressure. Max happens later in pike.

2:46PM (68,69) 0.80mTorr. 500% only! Looks like it doesn't get to the hot part. Pressure doesn't get low enough?

2:50PM (70,71) Stretched pulse to Guns, from 0.5 ms.
Yup, higher Gun rate! 1180/s!
Significant at higher energy >75ch, also

Spectrum in radial scan mount (SDD1) is pileup, which
Obscures confirmatory or contradictory info. But it
is not contradictory.

3:19PM (72,73) RMF-Frequency was adjusted. 2,700/s! But how much
of that is drift?

To averaged 2,119/s by the end. It could have been
done this at the very end, and its initial 1180/s would
drag down the average.

3:23PM (74,75) Back to the original frequency. 2,600/s. Yeah, it was drift!

3:28PM (76,77) 80kW forward power! 3,150/s, higher again.

Here's a weird thought... Maybe it's just time. Something happens
over the hours as we run, and the plasma gets hotter.

We should go back to the conditions of 1:14 PM after this.

3:34PM (78,79) 300A L2 from Magnet-Powers, up from 250A. 3,500/s

It wouldn't make sense for the CR to drift up, would it? 4,300/s

It appears to start lower than it ends. Well conditioning?

3:46PM (80,81) Hoping to repeat the conditions of spectrum 79. All of them have
Adjusted every parameter. 3,900/s!

At 0.33s: 4006/s @ 0.5s: 4038/s @ 1s: 4,200/s