

2020/02/12 Wednesday

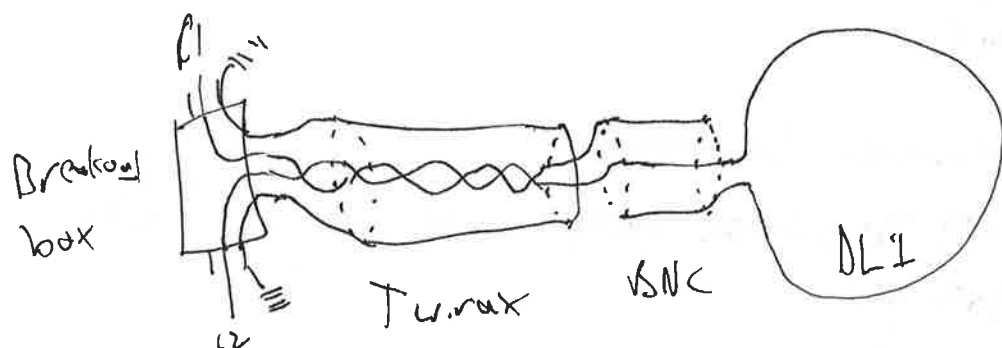
Diamagnetic loop scope. DL groundy scales.

ch2, 50 Ω : 2x DLP1.5 filters, 20" BNC cable to breakout box

ch3, 50 Ω : 2x DLP1.5 filters, 8" BNC cable to breakout box.

Breakout box: 2x BNC to Twmax. Grounds shorted.

Twmax to DL1, through a Twmax \rightarrow BNC adapter.



1:05pm: 1 μ W forward power at 4.3 MHz. No plasma, no B.

C2 RMS: 255 μ V

C3 RMS: 428 μ V

C2-C3 RMS: 538 μ V

C2+C3 RMS: 457 μ V

1:16pm: 2.5 μ W forward power MV, microvolt

C2 RMS 283 μ V

C3 RMS 523 μ V

C2-C3 RMS 660 μ V

C2+C3 RMS 520 μ V

1:16pm: 5 μ W forward power. No visible signal in (Sde)

C2 286 μ V $\pm 10\%$

C3 760 μ V

C2-C3 921 μ V

C2+C3 685 μ V

1:32pm 106W. Nothing visible in $\langle \Phi \rangle$ at 1mV/div. Good.

C2 350mV

C3 1.03mV

C2-C3 1.2mV

C2+C3 882mV

finally mV level.

1:37pm: 156W Nothing visible in $\langle \Phi \rangle$ at 1mV/div. Again good

C2 437mV

C3 1.12mV

C2-C3 1.47mV

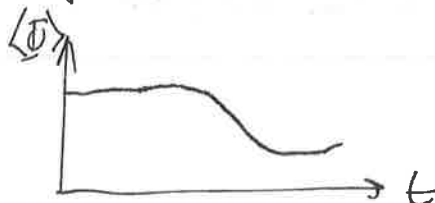
C2+C3 875mV

1:41pm: Nozzle feed activated No change.

1:43pm: Bg blue on. Ugh, this is horrible. Triangle waves. Very bad. $\langle \Phi \rangle$ is bad.

Bg blue & Magnapores on.

1:44pm: Magnapores off. No difference. Bg blue's needle twitches one for



RMF pulse! This is a big blue issue; big blue may be picking up the RMF signal.

4 μ Wb = $\boxed{4 \mu\text{V}\cdot\text{s}}$ from top to bottom. Bg Blue $\boxed{I = 203\text{A}}$

1:45pm: 313A Bg Blue 2.6 $\mu\text{V}\cdot\text{s}$ - 2.7 $\mu\text{V}\cdot\text{s}$

1:51pm: 201A Bg Blue 4 μWb 804

1:52pm: 16A Bg Blue 5.9 μWb 684

1:53pm: 148A Bg Blue 4.5 μWb 666

1:54pm: 178A BB. 4.2 μWb 747

1:55pm: 246A BB. 2.93 μWb

1:56pm: 345A AB 1.4 μWb

1:59pm: Magnapores on, 0A. 1.6 μWb . But not yet active

2:01pm: Magnapores active, 0A. 2.1 μWb .

2:02PM: Magnetron to 200A. $1.2 \mu Wb$

2:04PM: Magnetron to 300A $+1.0 \mu Wb$

2:07PM: MP to 400A $1.3 \mu Wb$

2:08PM: BS to 426A. $1.0 \mu Wb$ This was 3ms

2:10PM: Now 5ms RMF pulse. $0.8 \mu Wb$

2:14: Just drift. 400A MP, 426A BS $0.99 \mu Wb$ max excursion.



2:17PM: drift. $0.8 \mu Wb$ 15kW

2:19PM: RMF per 10.5kW. $0.54 \mu Wb - 0.58 \mu Wb$. I guess $\pm 0.03 \mu Wb$

2:20PM 6kW $0.24 \mu Wb$

2:22PM 2.4kW. $0.14 \mu Wb$ approx linear.

2:25PM 10ms pulse, 16.3kW. $1.15 \mu Wb$

2:29PM: 20ms pulse $2.26 \mu Wb$

2:30PM: B & Bhe down to 0A. Now there's an odd behavior



Wait now it's ok

2:39PM Now plasma! 15kW, into a true RMF plasma.

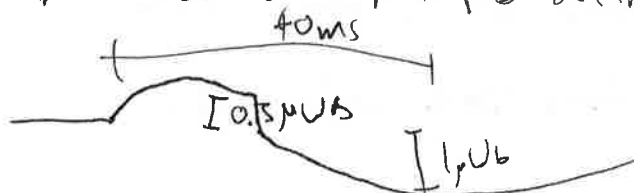
B & Bhe off. Magnetron 300A

Everything is different. (1) now 85mV RMS plasma must couple

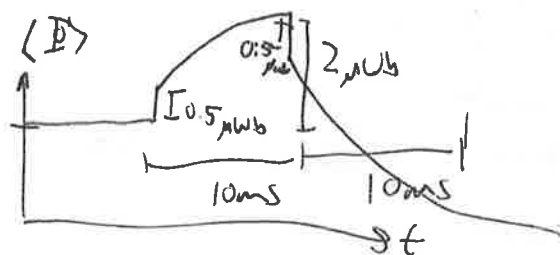
(2) now 39mV RMS Noise to DL!

$\langle E \rangle$ signal now has a post-pulse behavior & clear diamagnetic behavior

2:49PM



2:50PM 30.216 Forward RHF power

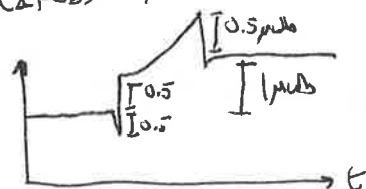


Baseline goes up somehow

Hmmm... the integral of the added signal shows some of the same features.

$$\langle E \rangle = \langle (C_2 - C_3) dt \rangle$$

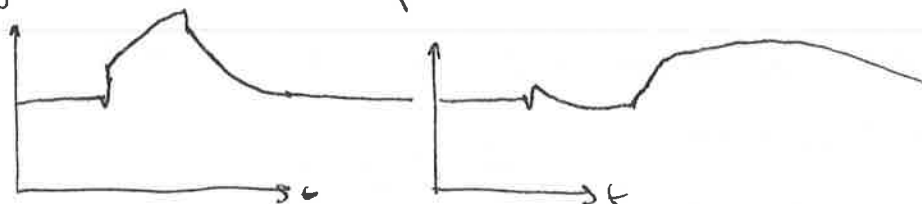
but $\langle \int (C_2 + C_3) dt \rangle$:



The added signal is presumably capacitive. Jump: conductor charges up.
Slope: charge neutral.

$$\langle \int C_2 dt \rangle$$

$$\langle \int C_3 dt \rangle$$



C_3 changes less than C_2 . Lower impedance to ground?

Is it the one that's the outer or inner capacitor of the
short twinax \rightarrow SMC adapter?

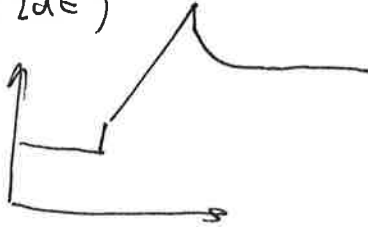
Downward spike: Shasta forms on DL shield.
But it's the same quantity both ways

\approx 3:12PM: DL1 shield grounded at the machine end.

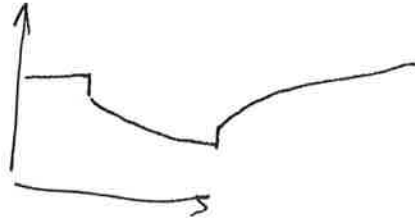
C_2 RMS 11mV, C_3 RMS 7mV. smaller now!

3:12 PM

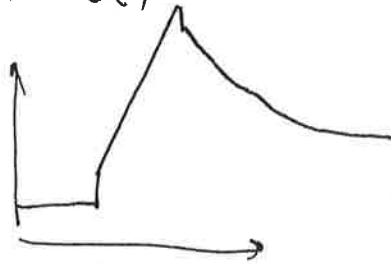
$\langle \int c_2 dt \rangle$



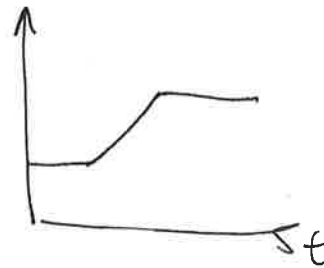
$\langle \int c_3 dt \rangle$



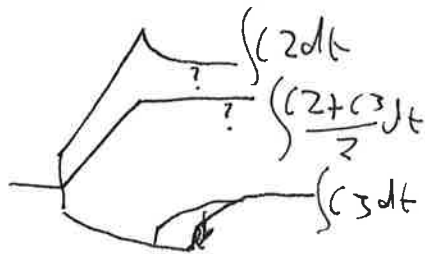
$\langle \int (c_2 - c_3) dt \rangle$



$\langle \int (c_2 + c_3) dt \rangle$



Grounded DL shield \rightarrow



maybe that's true $A \times c_2 + B \times c_3$?

TODO: try that $\uparrow \uparrow$

Yeah, in a perfect world $c_2 = c_{ap} + i_{ind}$ but capacitances of each are actually different
 $c_3 = c_{ap} - i_{ind}$

So $c_2 = A c_{ap} + B i_{ind}$
 $c_3 = C c_{ap} - D i_{ind}$

So c_2 & c_3 may be mixed & matched in a more ad-hoc way

