

prepared 2023-08-17,18 S.A. Cohen

Goals: Testing RMF amp; RF reflection (resonant frequency), with and without H₂ plasma, during slow and fast density-rise phases; measure P_r, Δf_{resonance}

One MP PS for L-2 coils died.

- a) I_{L-2} : $\sim 220, 320$ A (BB only); (MP problems)
- b) Nozzle: 100 A
- c) RMF: 1.7978 MHz
- d) Cap bank: 17 kV
- e) SRS: >1.51 Volts
- f) P_f to 100 kW; P_a to 30 kW
- g) $P_r/P_f \sim 1/2$ %
- i) Duration: 3 ms.
- i) Ops at $P_{cc} \sim 0.6$ and 1.5 mT, H_2
- k) Helicon: 300, 500 W

1. About 6000 plasma pulses.
2. $n_e \text{ max} \sim 4 \text{ Volts} \rightarrow 5e12/\text{cc}$

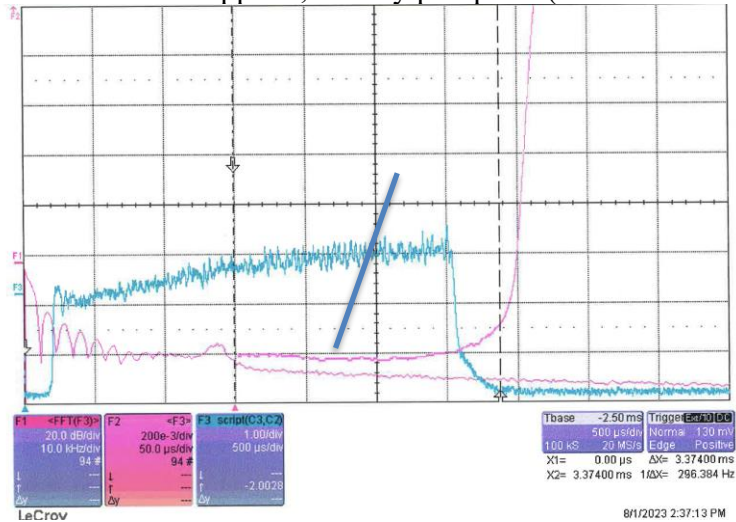


$p_{cc} = 0.6 \text{ mT}$, 50% n_e osc 14 then 11 kHz

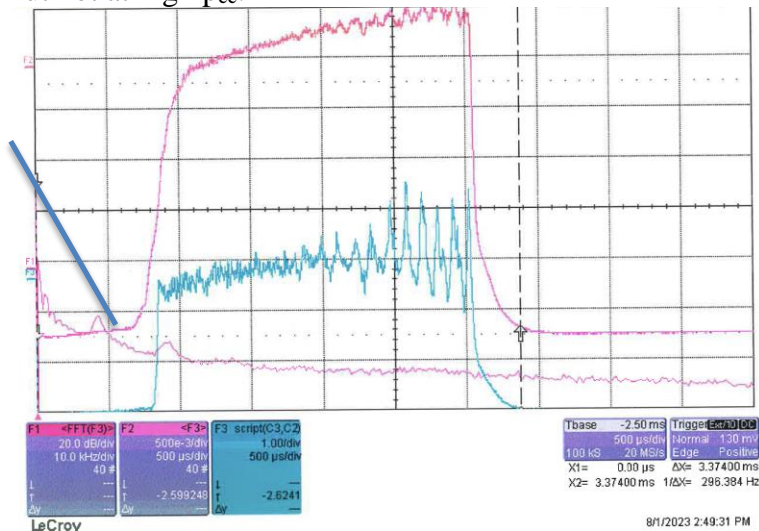
fundamental; n_e flat with t .


$$p_{cc} = 1.5 \text{ mT}, \quad n_e \text{ rises with } t.$$

3. When P_{RMF} first applied, density pump out (in “slow density rise” phase) at low p_{cc} .

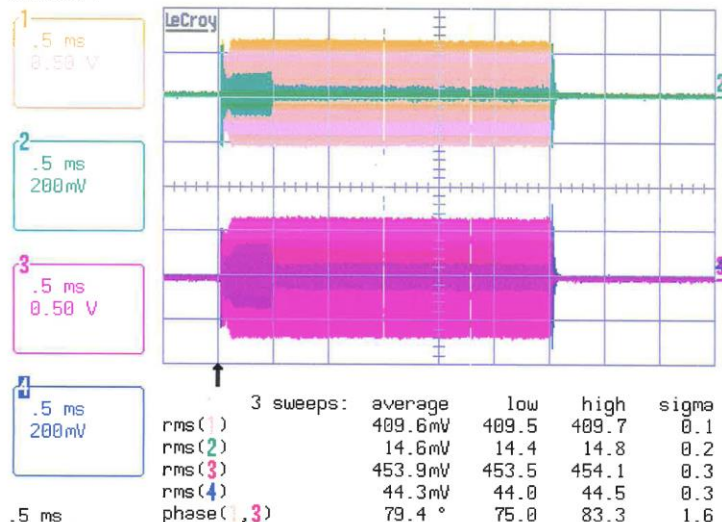


4. But not at high p_{cc} .



5.
6. $p_{cc} = 0.6$ mT $\tau_D = 0.2$ to 10 ms $f(P_f)$. Density decay first @ 0.07 ms then longer.
7. Good antenna current balance. Good tuning match N/S to T/B. P_f vs time
8. $P_r/P_f < 1\%$

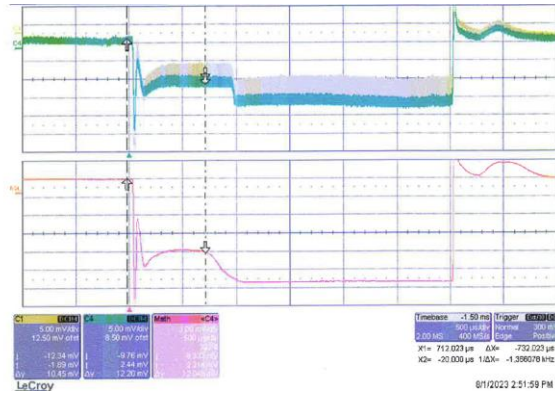
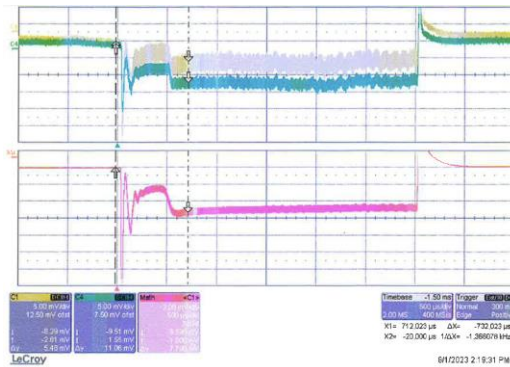
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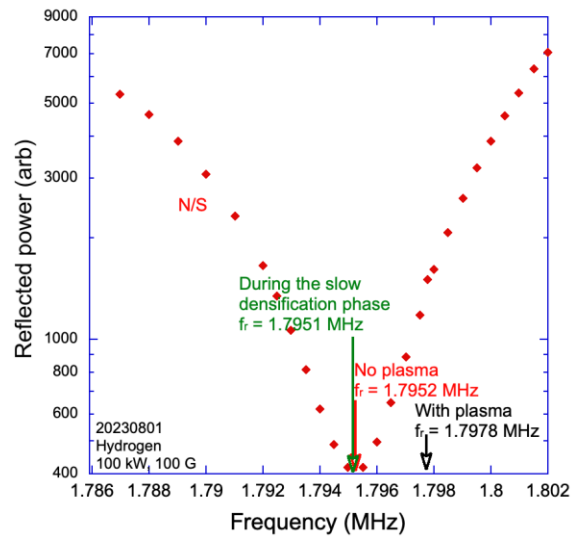
9.
10. Phase match, 99° to 106° (should be 94°)

11. Often imbalance in P_a . $P_a(N/S) \sim 1.4-2$
12. P_a before BBF 40-70% P_a during BBF

$\times P_a(T/B)$

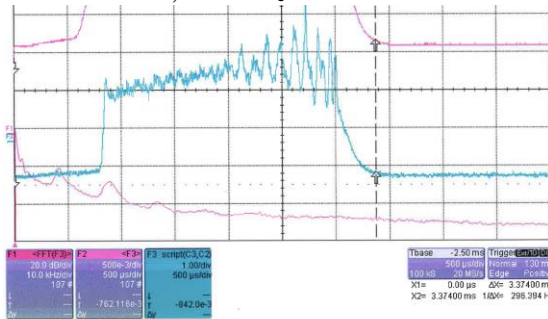


- 13.
14. Resonant frequency. Three cases: 1) no plasma; 2) during slow density rise phase; 3) in steady state $t \sim 1.5$ ms



15. $P_a \sim 30$ kW, $P_f \sim 100$ kW; $p_{cc} \sim 1.5$ mT
- This shift of the resonant frequency corresponds to 4 cm flux exclusion.

16. At resonance, more n_e oscillations



- 17.