Mj_Mag Calibration Files

13th December 2016

Total shots = 105

Today, I and Mike are taking calibration data for the mj_mag probe. This probe has 48 $\dot{B}$ probes in it and consists of five singlets, seventeen doublets and three triplets. Each probe will be kept at center for calibration.

Baseline SSX Taylor State Characterization Without installation of Theta-pinch coil

28th December 2016

Total shots = 100

Experiments are being done for the first time with the stagnation flux conserver (SFC) and installed in the vessel. The theta-pinch coil is not installed till now.

29th December 2016

Total shots = 40

Experiments are conducted with IDS, Mj_Mag magnetic probe and the HeNe Laser interferometer

---

30th December 2016

Total shots = 100

Took data with Intereferometer, Mj_Mag magnetics and IDS at low locations.

1. IDS mounted on the top mini port, Shot 1 – 50
2. IDS mounted on the side mini port in front of the HeNe Laser Scene beam (Laser off for these shots), Shot 51 - 100

4th January 2017

Total shots = 102

Experiments are conducted to check the HeNe Laser Interferometry set-up as well as the code.

For that a couple of shots will be taken by three techniques:

1. In the normal way, i.e., the Laser is all set-up and data will be saved in the usual (through the side radial port) way, Shot 1 – 21
2. By turning off the laser, Shot 22 – 40
3. By covering the detectors with a black cardboard piece, Shot 41 – 45
4. By switching off (the power to) the detectors, Shot 46 – 50
5. Reset the interferometer and covered the Wollaston prism along with the detectors with a black cloth, Shot 51 – 100
6. Switch off the laser to see the signal due to the plasma, Shot 101 – 102

In addition to this, the PMT bias is changed to 800 V.

5th Jan 2017

Total shots = 100

Changed the three gas cylinders (Hydrogen, Helium and Nitrogen). So using fresh hydrogen gas for the first time after my joining.

Changes:

1. New Hydrogen gas cylinder
2. Took data for three sets with different gas timings at 1 mW/sec and 4 kV:
   a. At 600 μs, Shot 1 – 51
   b. At 500 μs, Shot 52 – 75
   c. At 700 μs, Shot 76 – 100

6th Jan 2017

Total shots = 80

Experiments are conducted under different conditions: Stuffing flux: 1 mW/sec, 1.3 mW/sec and 1.5 mW/sec; Typical voltage: 4 kV and 4.5 kV;

Gas Delay: A - **600 micro sec**; Spectrometer dial reading at 19331.96 for C III and 18370.99 for C V (227.091 nm); PMT bias as 750 V and 800 V:

1. Stuffing Flux: 1 mW/sec, 4 kV, 19331.96 for C III and 800 V: Shot 1 – 10
2. Stuffing Flux: 1 mW/sec, 4 kV, dial reading 18670.99 for C V line (227.091 nm) and 800 V: Shot 10 – 20
3. Stuffing Flux: 1.3 mW/sec (delay in that case is **31.657 ms**), 4 kV, 19331.96 for C III and 800 V: Shot 20 – 40
4. Stuffing Flux: 1.5 mW/sec(delay in that case is **35. 107 ms)**, 4 kV, 19331.96 for C III and 800 V: Shot 41 – 55
5. Stuffing Flux: 1 mW/sec, 4 kV, 19331.96 for C III and 800 V: Shot 56 – 60
6. Stuffing Flux: 1 mW/sec, 4.5 kV, 19331.96 for C III and 800 V: Shot 61 – 70
7. Stuffing Flux: 1 mW/sec, 4.5 kV, 19331.96 for C III and 750 V: Shot 71 – 80

Baseline SSX Taylor State Characterization
After installing of Theta-pinch coil (cap bias off)

16th Jan 2017
Total shots = 93

On Thursday (12th Jan 2017), two graphite rods were installed in the vessel. On Friday, we cleaned the vessel through Helium DC glow discharge on the vessel and for few hours the gun. The theta-pinch coil has been installed on the glass tube. **The Switch and the Crowbar are being triggered using the East Gun SRS DG535**. Switch is triggered using Channel B at $A + 35\ \mu s$ and Crowbar using Channel C at $A + 36\ \mu s$. These shot are being taken without charging the theta-pinch coil. Only switches are being fired.

Two Experiments are conducted under different conditions: Stuffing flux: 1 mW/sec; Typical voltage: 4 kV; Gas Delay: A - **600 micro sec**; Spectrometer dial reading at 19331.96 for C III; PMT bias as 750 V

1. Switch delay=A+35 μs and Crowbar delay= A+36 μs: Shot 10 – 60
2. Switch delay: $T + 35\ \mu s$ and Crowbar delay: $T + 36\ \mu s$: Shot 60 – 70
3. Switch delay: $T + 70\ \mu s$ and Crowbar delay: $T + 71\ \mu s$: Shot 71 – 85
4. Switch delay: $T + 60\ \mu s$ and Crowbar delay: $T + 61\ \mu s$: Shot 86 – 91
5. No Plasma Shots, Switch delay: $T + 70\ \mu s$ and Crowbar delay: $T + 71\ \mu s$: Shot 92 – 93

20th Jan 2017
Total shots = 33
The Theta-pinch coil was tested without producing plasma for the first time after installation on the glass tube.

Theta-pinch coil On

23rd Jan 2017
Total shots = 25

Today experiments are going to be conducted with the Theta-pinch coil on with Stuffing flux: 1 mW/sec, Typical voltage: 4 kV; Gas Delay: A - **600 micro sec**; Spectrometer dial reading at 19331.96 for C III; PMT bias as 750 V:

1. **Theta-pinch coil Off**, Switch delay = $A + 30\ \mu s$, Crowbar delay = $A + 31\ \mu s$: Shot 1 – 12
2. **Theta-pinch coil On**, $V_{coil} = 25\ kV$, Switch delay = $A + 30\ \mu s$, Crowbar delay = $A + 31\ \mu s$: Shot 13 – 23

3. **Theta-pinch coil On**, $V_{coil} = 25\ kV$, Switch delay = $A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: Shot 24 – 25

24th Jan 2017
Total shots =101

A new telescope extension has been installed for better focus. The experiments will be conducted with the Theta-pinch coil on: Stuffing flux: 1 mW/sec, Typical voltage: 4 kV; Gas Delay: A - **600 micro sec**; Spectrometer dial reading at 19331.96 for C III; PMT bias as 750 V.

4. Theta-pinch Coil off: **Shot 1 – 9**
1. Theta-pinch Coil On, $V_{coil} = 26 - 30\ kV$, Switch delay = $A + 40\ \mu s$, Crowbar delay = $A + 41\ \mu s$: **Shot 9 – 20**
2. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 40\ \mu s$, Crowbar delay = $A + 41\ \mu s$: **Shot 21 – 30**
3. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 45\ \mu s$, Crowbar delay = $A + 46\ \mu s$: **Shot 31 – 40**
4. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: **Shot 41 – 50**
5. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 55\ \mu s$, Crowbar delay = $A + 56\ \mu s$: **Shot 51 – 60**
6. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 60\ \mu s$, Crowbar delay = $A + 61\ \mu s$: **Shot 61 – 70**
7. Theta-pinch Coil On, $V_{coil} = 25\ kV$, Switch delay = $A + 65\ \mu s$, Crowbar delay = $A + 66\ \mu s$: **Shot 72 – 84**
8. Theta-pinch Coil On, $V_{coil} = 33\ kV$, Switch delay = $A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: **Shot 85 – 86**
9. Theta-pinch Coil On, $V_{coil} = 30\ kV$, Switch delay = $A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: **Shot 87 – 88**
10. Theta-pinch Coil On, $V_{gun} = 4.5\ kV$, $V_{coil} = 25\ kV$, Switch delay =

$A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: **Shot 89 – 96** (for shot 96, PMT bias was 700 V.)

11. Theta-pinch Coil On, $PMT\ bias = 700\ V$, $V_{coil} = 25\ kV$, Switch delay = $A + 50\ \mu s$, Crowbar delay = $A + 51\ \mu s$: **Shot 97 – 101**