

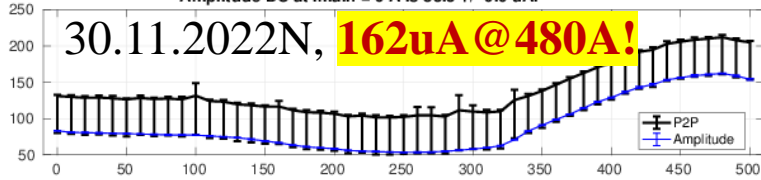
# Dark current and mini- Breakdown rate studies

08.12.2022N-09.12.2022A

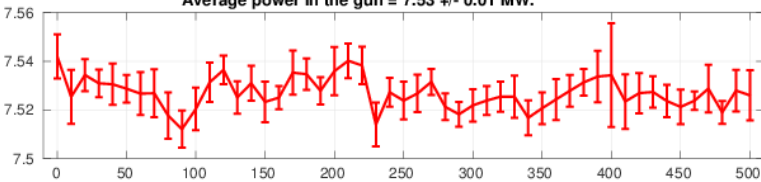
# Dark current studies

06.12.2022A

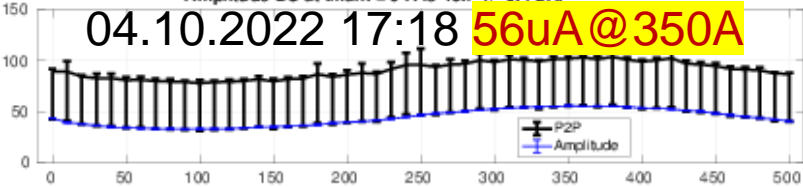
Maximum from P2P = 211.8 +/- 3.3 - 50.8 uA at I<sub>main</sub> = 480.0 A.  
 Maximum from Amplitude = 162.1 +/- 0.6 uA at I<sub>main</sub> = 480.0 A.  
 P2P DC at I<sub>main</sub> = 0 A is 131.0 +/- 1.8 - 50.8 uA.  
 Amplitude DC at I<sub>main</sub> = 0 A is 83.3 +/- 0.6 uA.



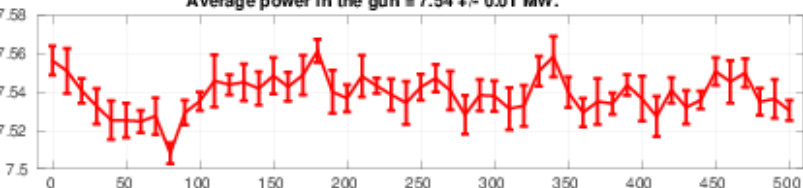
Gun power (at I<sub>main</sub> = 480.0 A) = 7.52 MW.  
 Average power in the gun = 7.53 +/- 0.01 MW.



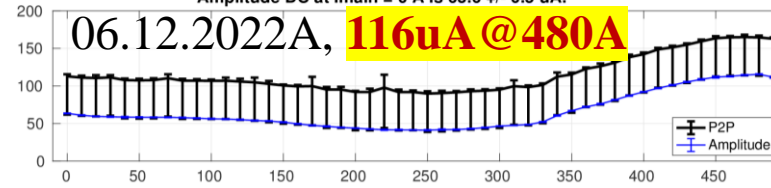
Maximum from P2P = 103.8 +/- 4.8 - 46.7 uA at I<sub>main</sub> = 380.0 A.  
 Maximum from Amplitude = 55.8 +/- 0.6 uA at I<sub>main</sub> = 350.0 A.  
 P2P DC at I<sub>main</sub> = 0 A is 89.7 +/- 2.2 - 46.7 uA.  
 Amplitude DC at I<sub>main</sub> = 0 A is 43.7 +/- 0.4 uA.



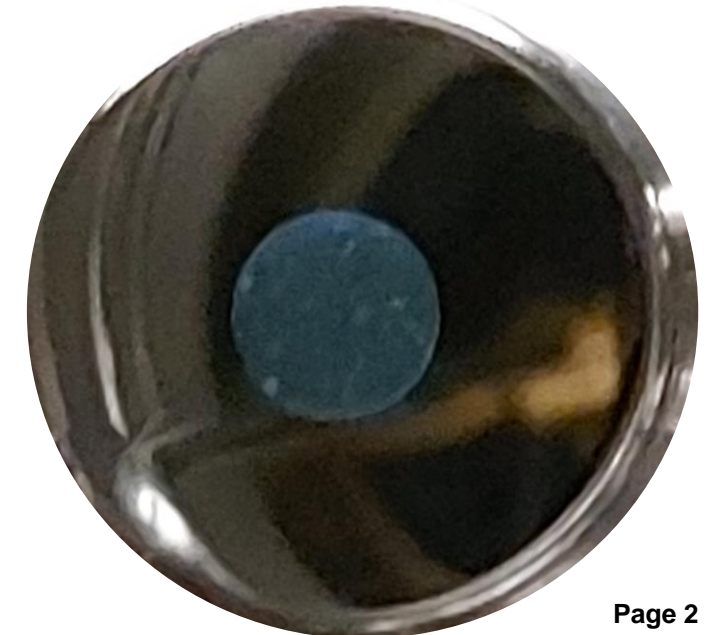
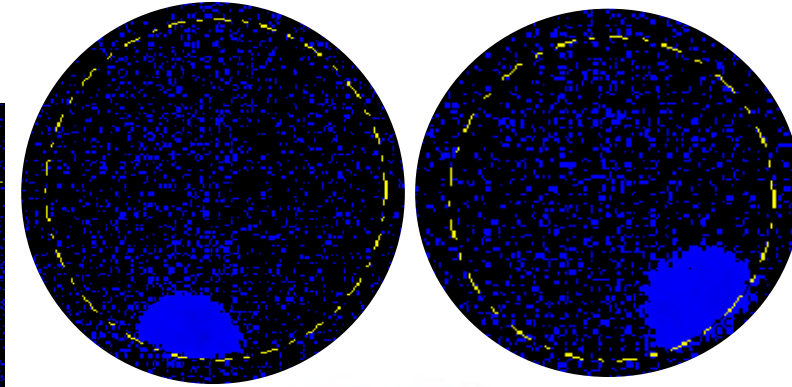
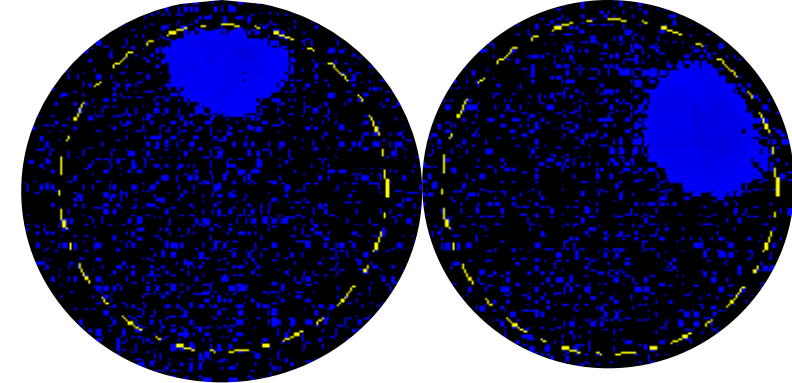
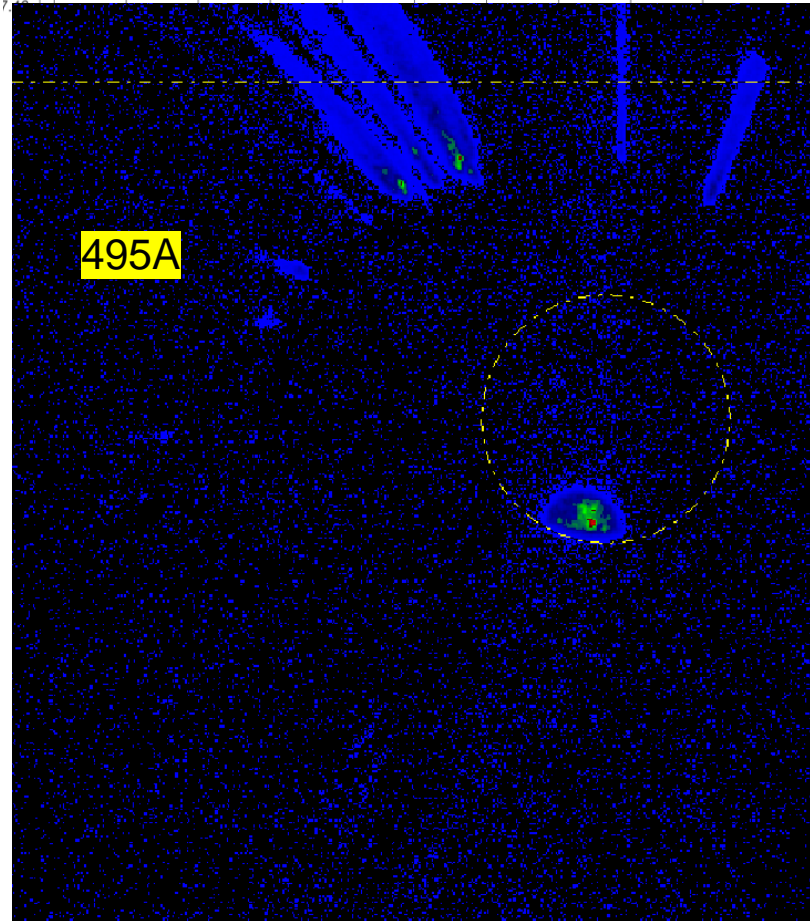
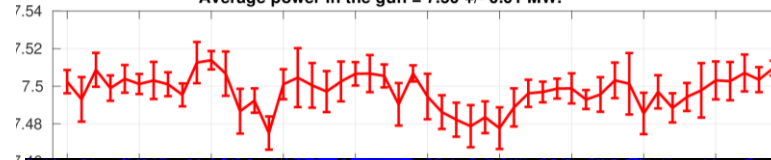
Gun power (at I<sub>main</sub> = 380.0 A) = 7.53 MW.  
 Average power in the gun = 7.54 +/- 0.01 MW.



Maximum from P2P = 165.1 +/- 3.1 - 50.9 uA at I<sub>main</sub> = 470.0 A.  
 Maximum from Amplitude = 115.6 +/- 0.7 uA at I<sub>main</sub> = 480.0 A.  
 P2P DC at I<sub>main</sub> = 0 A is 112.9 +/- 2.8 - 50.9 uA.  
 Amplitude DC at I<sub>main</sub> = 0 A is 63.6 +/- 0.5 uA.



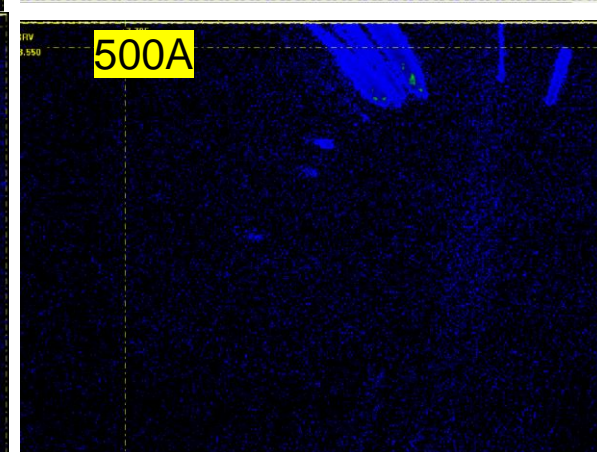
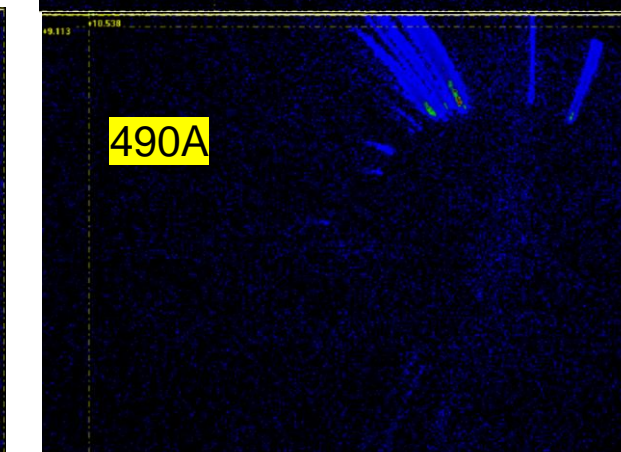
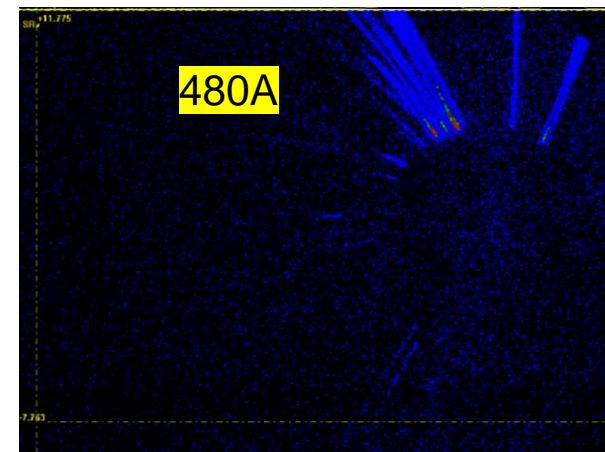
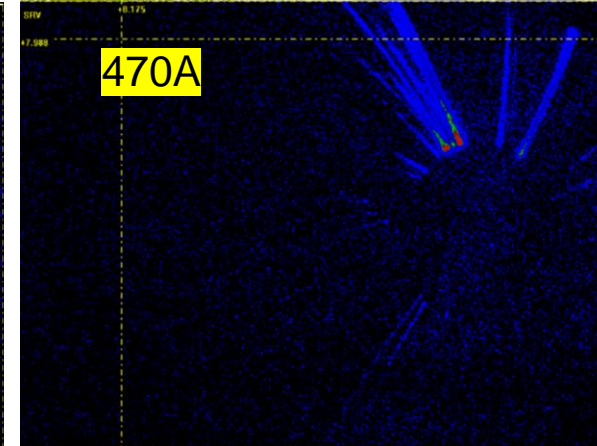
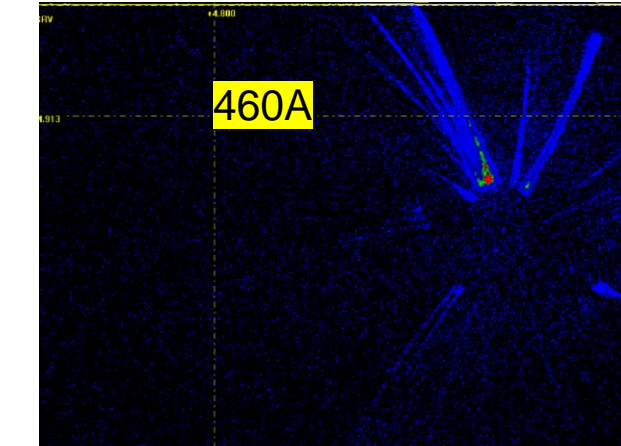
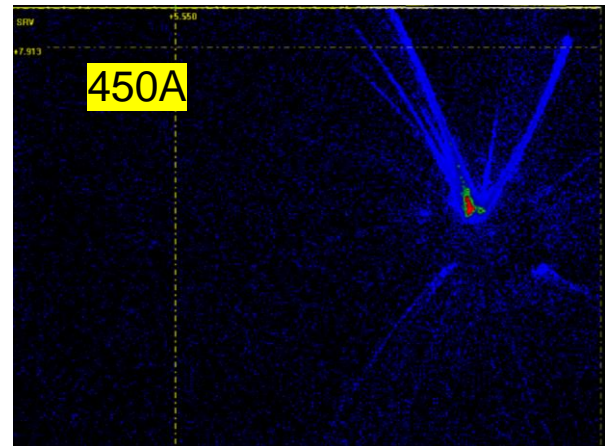
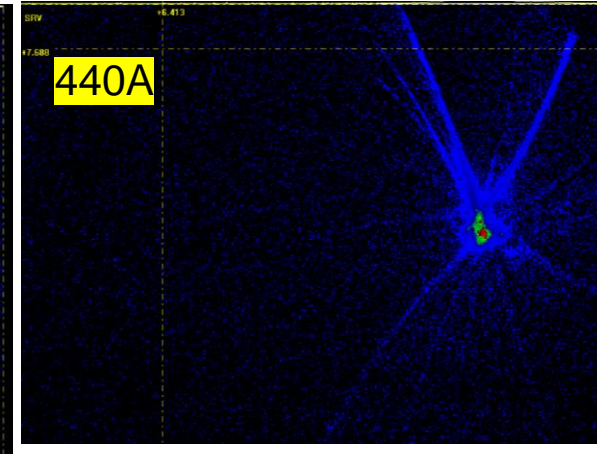
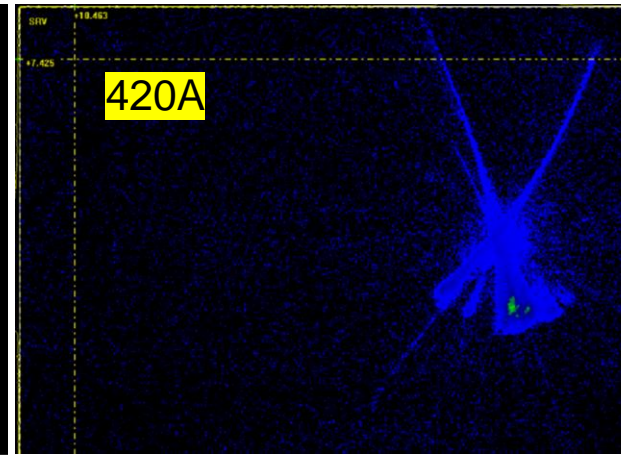
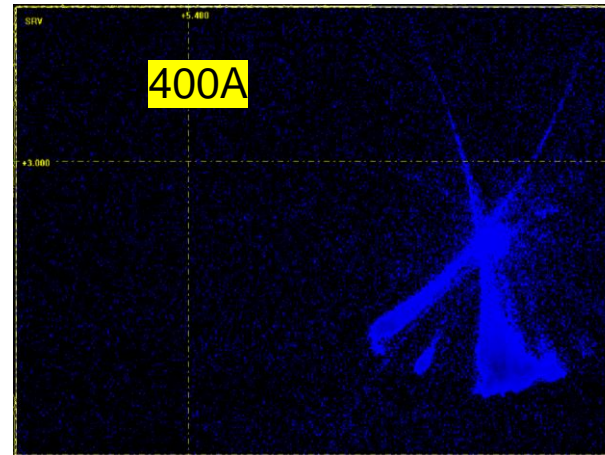
Gun power (at I<sub>main</sub> = 470.0 A) = 7.51 MW.  
 Average power in the gun = 7.50 +/- 0.01 MW.





# Dark current imaging

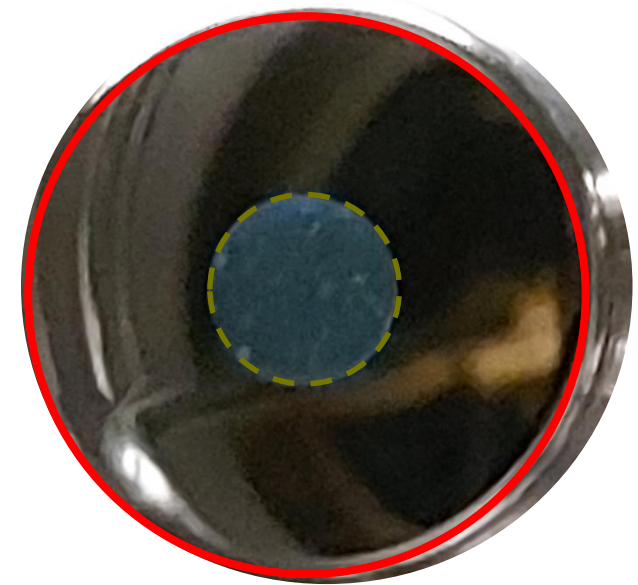
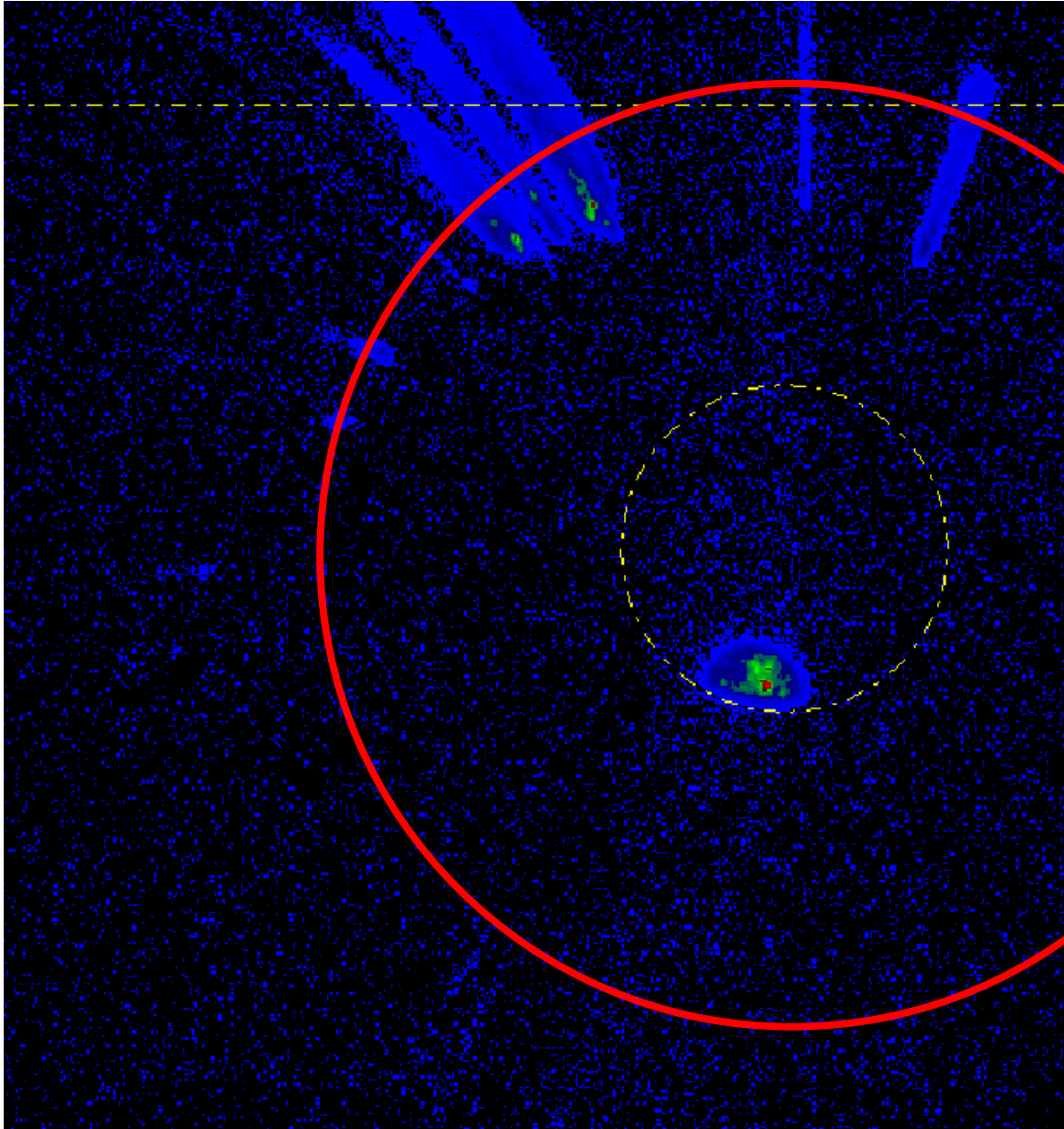
06.12.2022A





# Dark current studies

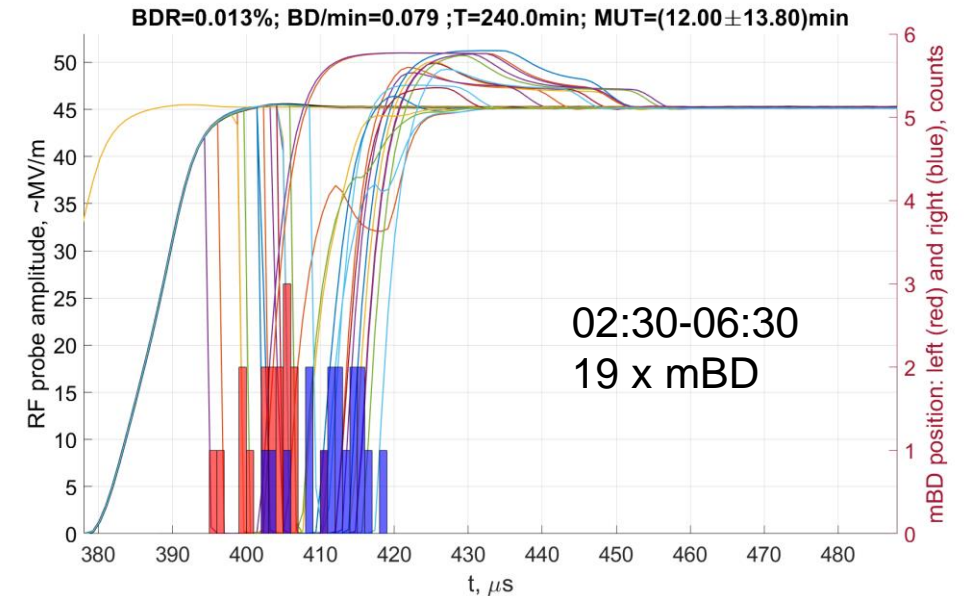
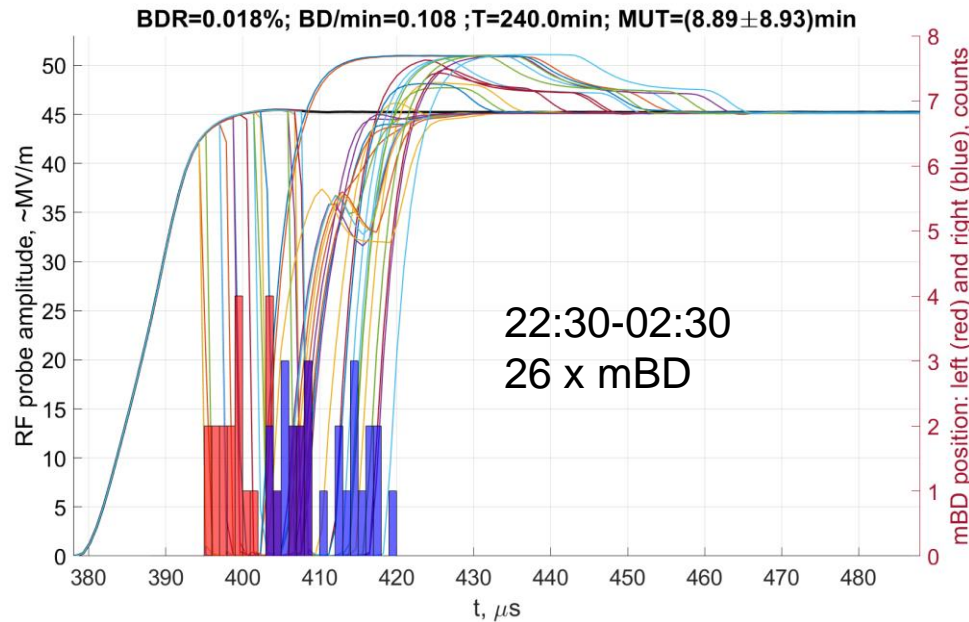
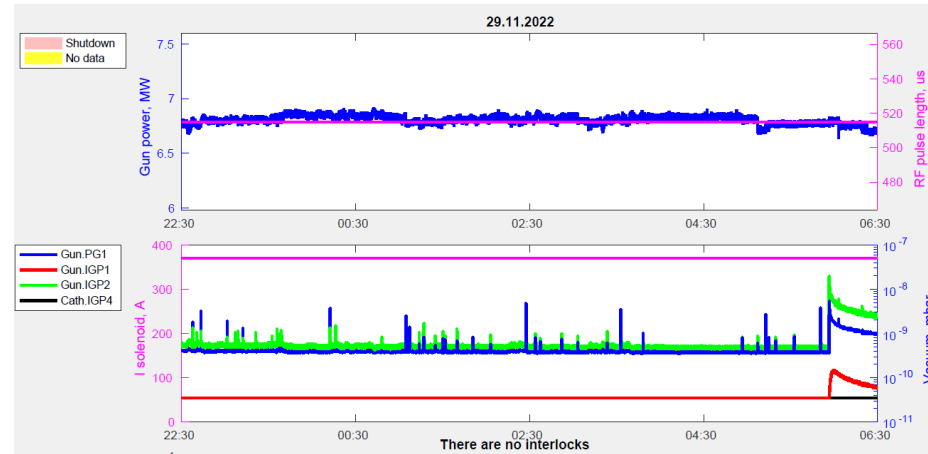
06.12.2022A



NB:  $\varphi(DC) - \varphi(\text{beam}) \approx 45\text{deg}$

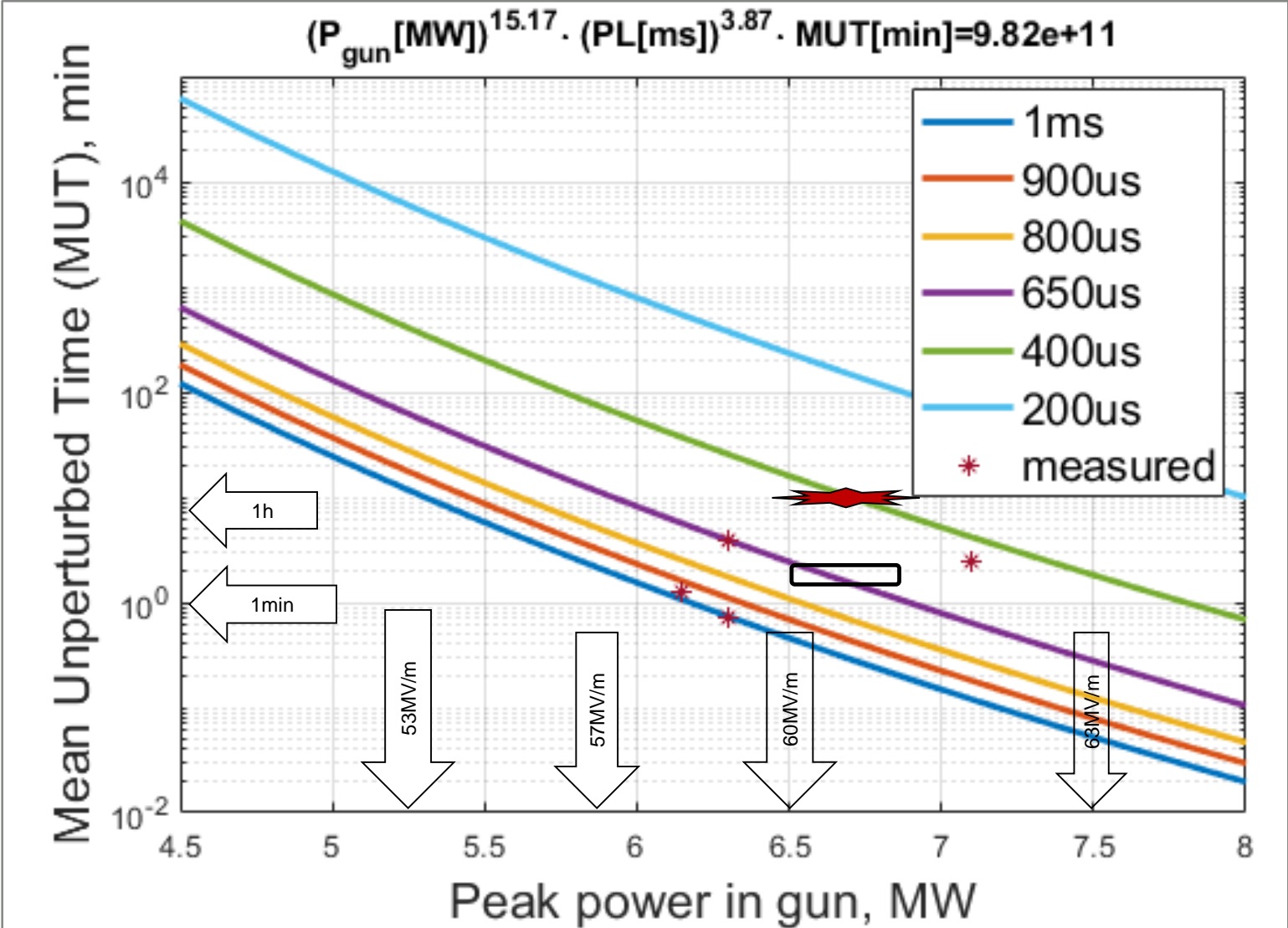
# 29.11.2022N – Automatic run (keeping running)

Mini-Breakdown analysis 8hours at 6.8MWg x 500us, FB=ON!



# Mean Unperturbed Time scaling

Adding data from 29.11.2022N (6.8MWg now~> 60MV/m)



# Run weeks 49 planning

Status 06.12.2022

Week 49	Mon Dec-05	Tue Dec-06	Wed Dec-07	Thu Dec-08	Fri Dec-09	Sat Dec-10	Sun Dec-11
<b>Morn.</b> 7:00 to 15:30	mod laser Richard Aftab THz (seeding, GG)	QE, 695.1 Dark current and DC imaging? Grebinyk unmod laser	Aftab Grebinyk	Li Grebinyk	Hoffmann Oppelt Gun5.1 Cond.	Hoffmann Liebel	Richard Mohanty
<b>Late</b> 15:00 to 23:30	Vashchenko Lotfi	Krasilnikov Liebel Beam for Dosimetry	FLASH-RT Gross Lotfi		Krasilnikov Lotfi cath695.1	FLASH-RT Krasilnikov Lotfi Kongmon	
<b>Night</b> 23:00 to 7:30	Automatic Conditioning QE--map #695.1	Vashchenko Dmitriiev	Richard FLASH-RT Vashchenko	Richard Gun5.1 Cond. Vashchenko	Gross Grebinyk	Gross FLASH-RT Grebinyk	Gross Grebinyk
<b>Resp. Phys</b>	Vashchenko						

### FLASH-RT:

1. Charite (Sarcoma organoids)→Jan
2. HZDR (Zebrafish)→?
3. Chemistry/Biology/Biochemistry (AG)
4. Dosimetry (gafchromic films) (FR)
5. Water phantom from Daresbury

### Other studies:

1. Gun5 conditioning status check, mini-BDR studies, gamma-detectors in the coupler (MK)
2. New BPMs calibration (DD, MK)
3. New FC calibration → done?
4. Chicane.BPM1 tuning/calibration (MK, DD)
5. Beam trajectory (DD)

# Mini-Breakdown rate check + testing some ideas

## Possible plan for 08.12.2022N-09.12.2022A

1. Insert Mo cathode
2. Measure dark current (7.5MWg) – solenoid scan
3. Dark current imaging (7.5MWg, ~495A)
4. ~~Pgun=6.8MWg~~ 7.4MWg (~60MV/m) 650us, ~5%refl (record gun SPT/Trdbk), no FB → long run (4-6hours), counting vacuum mini spikes (40-50?) → measure T~4-5h(?)
5. 650us, 1MWg, start phase modulation for 5%refl → slow SP ramping + phase slope tuning SPT keeping 5%refl → Pgun (record parameters) → run T~4-5h(?), counting vacuum mini spikes  
To setup modulations: PITZ GUN -->LLRF Expert-->Pulse--> Frequency sweep (Modulation Freq.[kHz]) (up to 150kHz?)
6. Multi flattop option test: reduce 1<sup>st</sup> 100us SPA by 30%(?), ramp to Pgun, tune SPT for 5%refl, run T~4-5h(?)