

# ARES Operation Meeting

Summary of week 43 / 2023

**Max Kellermeier**, on behalf of the ARES crew

# Summary of week 43

## Achievements

## Difficulties

## Notes

Mon. 23 <sup>rd</sup> Oct	Tue. 24 <sup>th</sup> Oct	Wed. 25 <sup>th</sup> Oct	Thu. 26 <sup>th</sup> Oct	Fri. 27 <sup>th</sup> Oct
<ul style="list-style-type: none"> <li>Tunnel open for maintenance:               <ul style="list-style-type: none"> <li>Experimental setup by D3</li> <li>Grounding net installation by Wille</li> <li>ZM working on TDS mover system (controls)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Beam size on FL screen established for D3 tests</li> <li>Vert. and Hor. Scans on NitroFlash detector → center defined</li> <li>Fine 2D scan set up for overnight run</li> <li>PolariX conditioning (off-beam)</li> </ul>	<ul style="list-style-type: none"> <li>Intensity scans on NitroFlash detector</li> </ul>	<ul style="list-style-type: none"> <li>Beam size scans on NitroFlash detector</li> <li>Pulse shot measurements with dosimetry films</li> <li>TLD sample holder installed</li> <li>2D scan started</li> </ul>	<ul style="list-style-type: none"> <li>Machine state recovery</li> <li>2D scan repeated</li> </ul>
		<ul style="list-style-type: none"> <li>Overnight: Valves closed due to vacuum event in PolariX</li> <li>Tektronix scope died</li> </ul>	<ul style="list-style-type: none"> <li>TWSs modulators in fault state again</li> <li>Water flow rate warning on Gun modulator (Power supply)</li> </ul>	<ul style="list-style-type: none"> <li>Overnight: Valves closed due to vacuum event in PolariX</li> <li>Power glitch → DIO.1 couldn't be restarted</li> <li>BC dipole turned on</li> </ul>
		<ul style="list-style-type: none"> <li><i>Scan tool tool take way longer than expected</i></li> <li><i>PolariX conditioning</i></li> </ul>	<ul style="list-style-type: none"> <li><i>PolariX conditioning</i></li> </ul>	<ul style="list-style-type: none"> <li><i>PolariX conditioning</i></li> </ul>

# D3@ARES 23.10. - 27.10.2023 NitroFlash Measurements

## Detector response measurements and dosimetry film irradiation

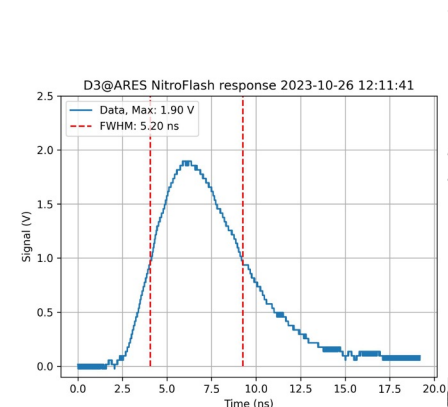
### Goals:

- Measure the NitroFlash0 detector response at different positions and beam intensities
- Irradiate dosimetry films and TLDs for dose references

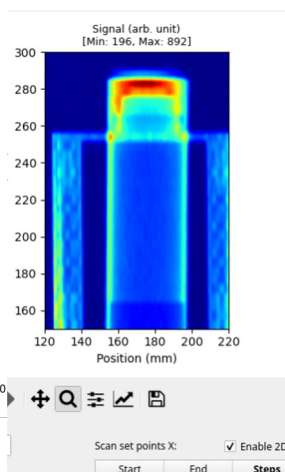
Most of the measurements were performed. Accelerator and data acquisition worked most of the time.

In some cases measurements had to be repeated due to minor issues during the runs.

TLDs were not irradiated due to the lack of time.



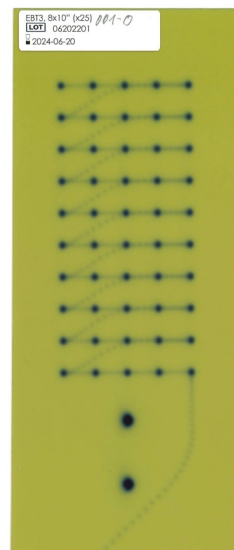
Response signal.



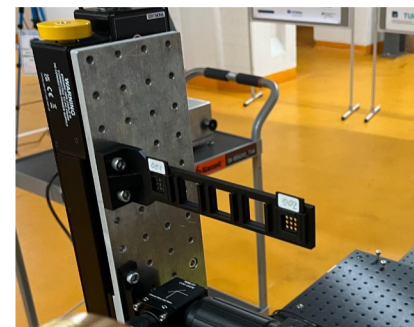
X-Y Scans with detector response measurements.



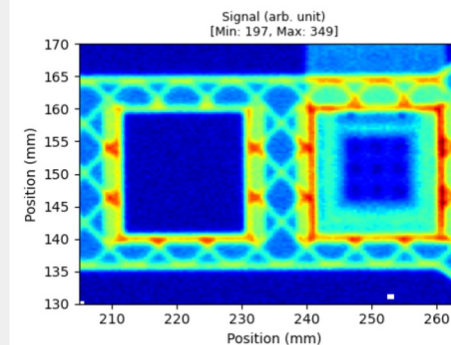
Setup with irradiated films.



Scanned film.



Setup for film and TLD irradiation.



2D Scan for position determination.

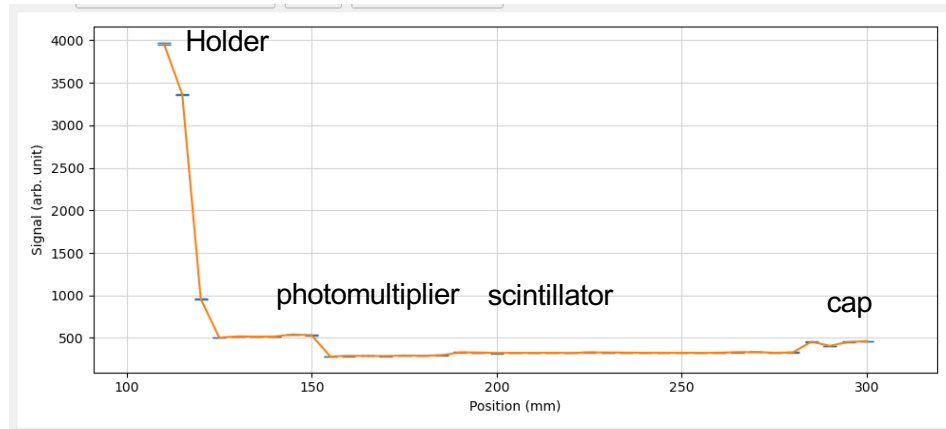
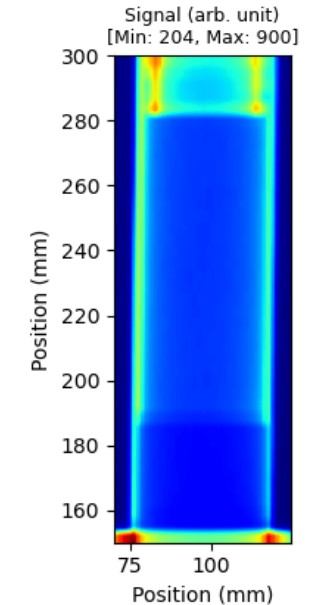
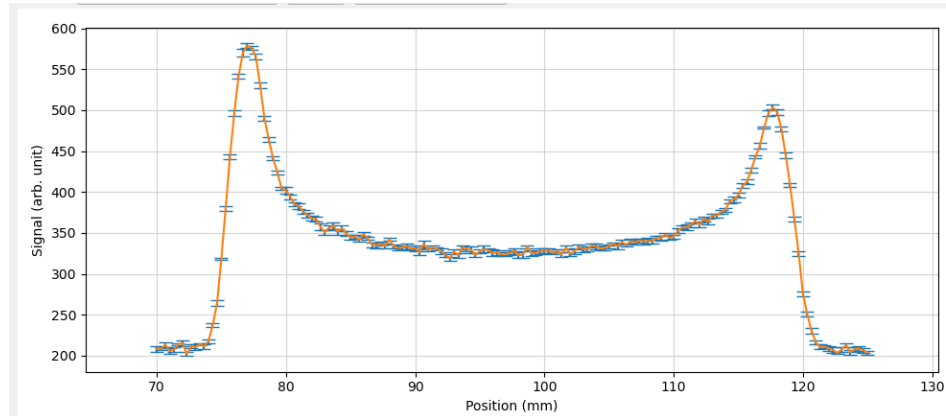
Now: Data analysis...

Thanks to the ARES OP Team!

# Alignment Scan on NitroFlash Detector

Tuesday

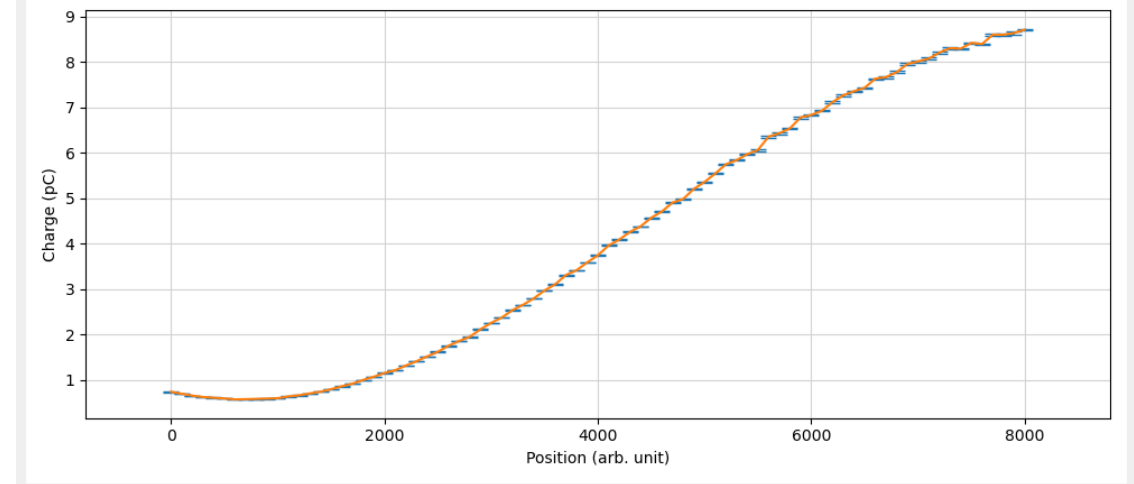
- One of the UKE WP loaded with 74 MV/m gun gradient, 3 pC
- last DL quads tuned for beam size
- Alignment scans using *Hockey Stick* BLM → (97.4, 220) defined as center
- Overnight 2D scan failed: Tektronix scope stopped working around 8 p.m.  
→ ZZ to restart  
→ overnight scan repeated from Wed to Thu
- Wed morning: Valves closed around Polarix, but scan already finished



# Intensity scans

Wednesday

- 2D scans at different Pharos settings (25%, 15%, 45%)
  - laser attenuator: 1800 to 7500 (roughly linear regime)
  - FL y stage: 210mm to 280mm
  - Beam size checked before each scan at low and high charge
- Mid charge range: 0.98 pC to 8.8 pC
- Low charge range: 0.18 pC to 1.6 pC
- High charge range: 5.7 pC to 27.5 pC
  - Might have had beam clipping, but not critical (final measurement at T-ICT)



Overnight: repeated 2D scan

# Beam size scans and new holder installation

Thursday

- Changed beam size by moving along z → scattering from TI vacuum window more severe (to be repeated with adjusting quads)
- Detector Data acquisition for 1min
- New holder installed → screen + cam moved by

z /mm	$\sigma_x$ (gaussian fit) /mm	$\sigma_y$ (gaussian fit) /mm
213	0.56	0.58
153	0.71	0.72
93	0.85	0.87
33	1.00	1.01

(Z-pos. for screen, detector is always +87mm)

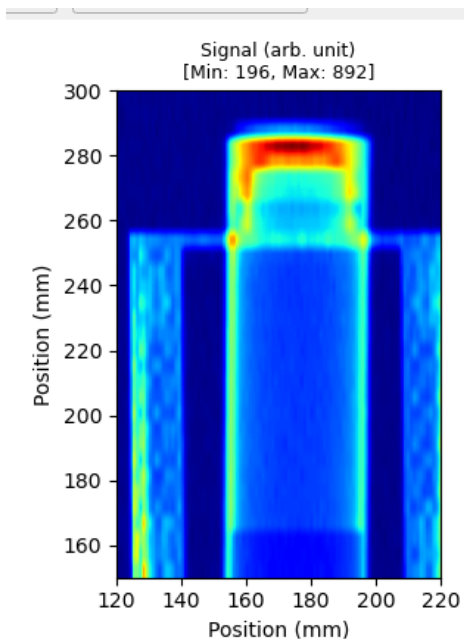




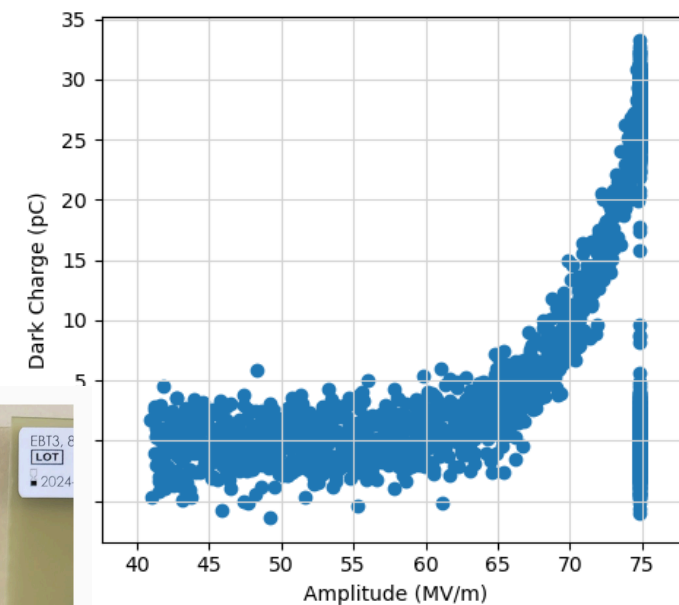
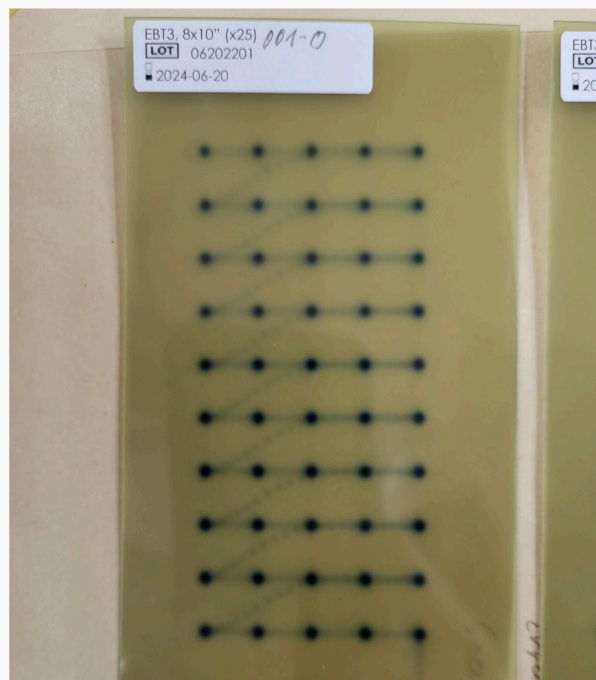
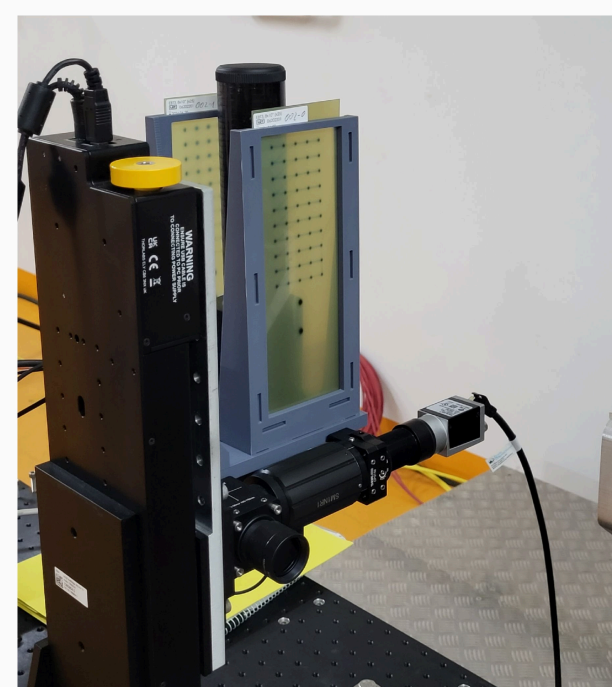
# Measurements with film holder

Thursday

Alignment scans w/out film



- Pulse shot mode: 3 pulses per spot
- Dark current severe  
→ Dark current spots each 1 min. (via valve)
- Done twice (3 ZZs)

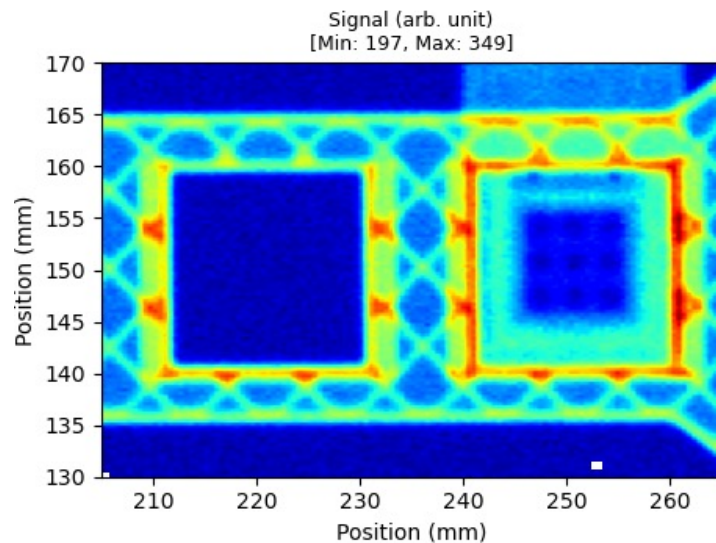


→ 64 MV/m working point next time

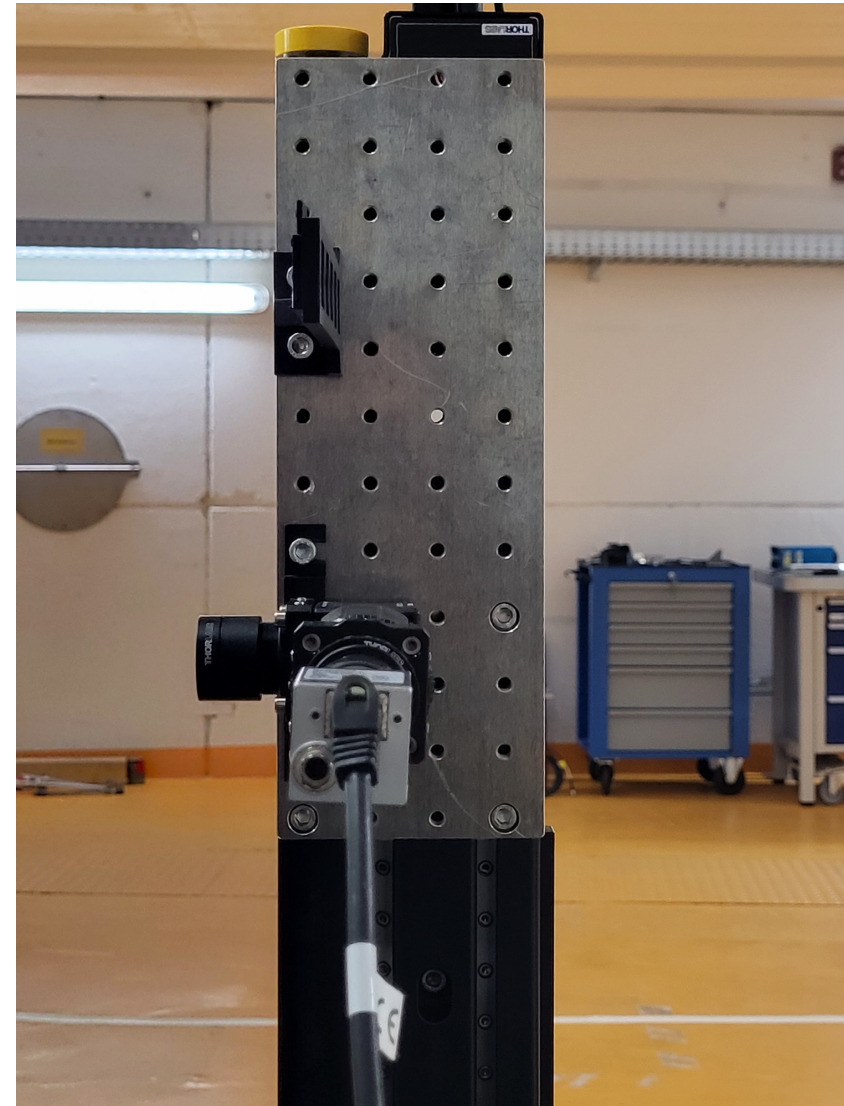
# TLD holder installation

Thursday/ Friday

- TLD holder installed
- 1D Positions scanned to define reference points
- 2D overnight scan (failed and repeated on friday)
- Left most slot (from beam perspective): alignment grid; Second slot empty

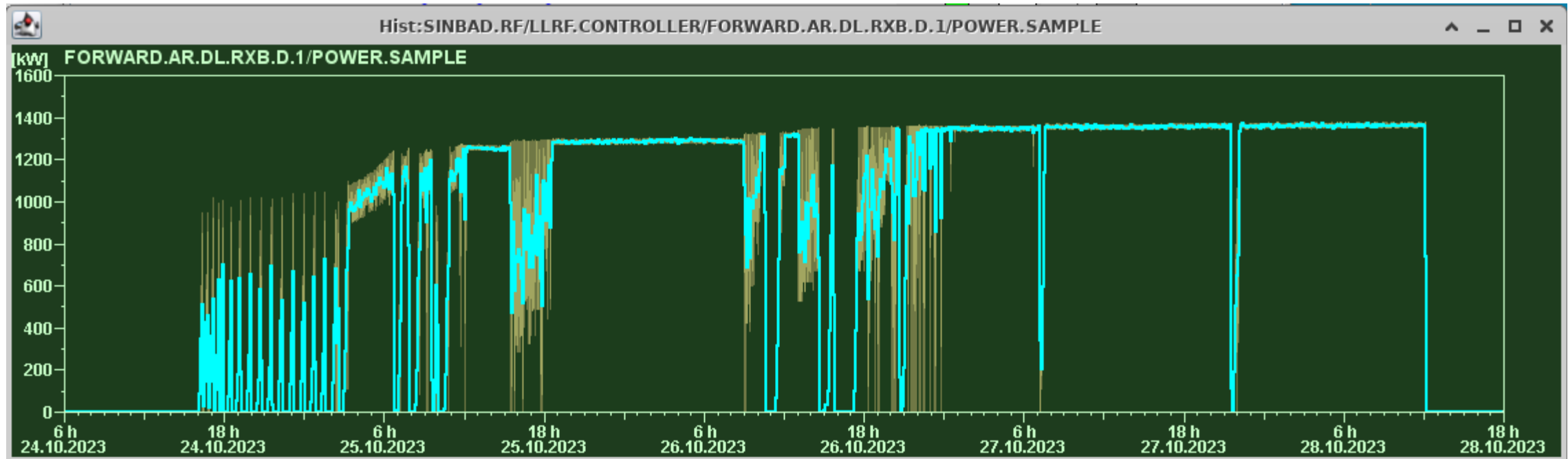


→ No TLD irradiation





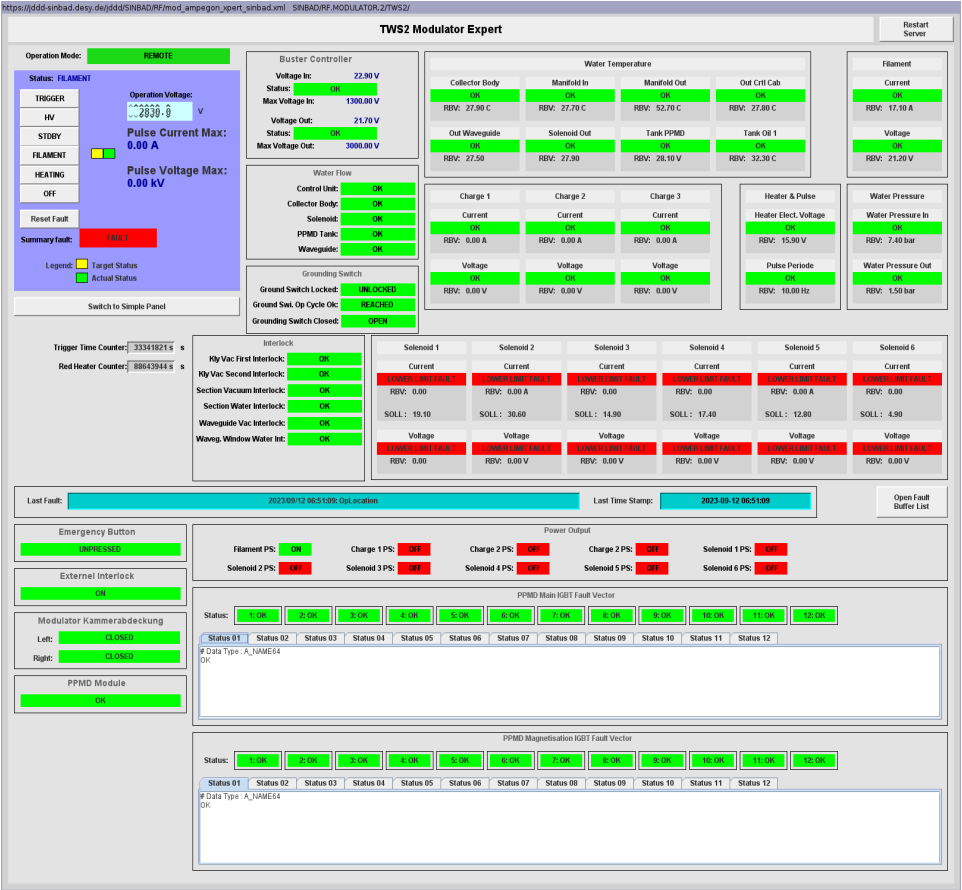
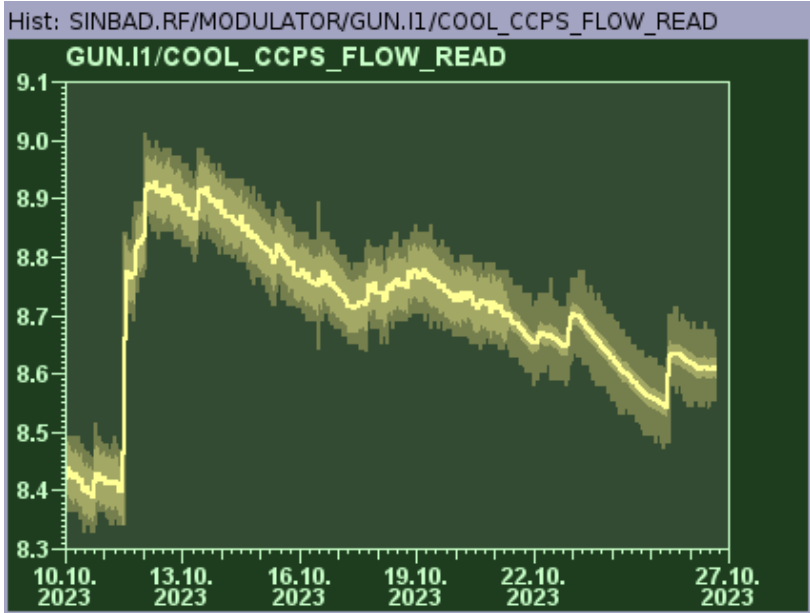
# PolariX conditioning



- At 1.35 MW
- Two vacuum interlocks during overnight runs interrupted measurements due to closing valves

# Issues with S-Band structures

- Thu: After 1st ZZ both TWSs couldn't be set back to TRIGGER with known fault state → after repeated filament mode it worked again
- Thu: After 2nd ZZ warning on Gun modulator about low water flow rate
- Fri: TWS2 fault state again → MIN contacted



(Old panel screenshot from two month ago)

# Schedule and Plan for the Week

## Week 44

Date	Shift Crew
30.10.	--
31.10.	-- (public holiday)
01.11.	Willi, Max
02.11.	Frank, Hannes
03.11.	Frank, Willi, Thomas (?)

- Mon: Tunnel to be closed in the afternoon for PolariX conditioning over the public holiday
- Wed to Fri: UKE beam time
- PolariX Conditioning (off-beam)

If you want to learn or join the shift: please give the shift leader a call (BKR 2840 / SINBAD Box 2454)