

# Summary of KW 41

|                            | Monday 9 <sup>th</sup><br>October  | Tuesday 10 <sup>th</sup><br>October  | Wednesday 11 <sup>th</sup><br>October  | Thursday 12 <sup>th</sup><br>October  | Friday 13 <sup>th</sup><br>October  |
|----------------------------|--|--|--|---|---|
| <b>Achievements</b>        | <ul style="list-style-type: none"> <li>* Tunnel open for maintenance day</li> <li>* Calibration of new SH.D1 screen station</li> </ul> | <ul style="list-style-type: none"> <li>* AA runs (also overnight)</li> </ul>   | <ul style="list-style-type: none"> <li>* MDI beamtime: ICT with new cable vs T-ICT and FC</li> <li>* MDI beamtime: BPM tests</li> <li>* Try to measure cathode laser timing jitter. Failed → Overnight charge stability measurement</li> </ul> | <ul style="list-style-type: none"> <li>* Tests on new SH.D1 screen station + Quad scan for k-value determination</li> <li>* MDI beamtime: BPM tests</li> <li>* Try to measure cathode laser timing jitter + Overnight charge stability measurement</li> </ul> | <ul style="list-style-type: none"> <li>* Beam timing jitter measurement (TWS1 on-crest and +80° off-crest)</li> <li>* MDI BPM tests in parallel</li> <li>* 36 hours charge stability measurement started</li> </ul> |
| <b>Perturbating events</b> | -  | <ul style="list-style-type: none"> <li>* TWS2 modulator in fault (water) → Tunnel access to solve the problem</li> </ul> | -  | <ul style="list-style-type: none"> <li>* TWS2 crash (feed-forward removed and LLRF server restart) → OVC needed to be reset</li> </ul>  | <ul style="list-style-type: none"> <li>* X-band klystron under investigation (filament) → <u>Do not start modulator yet</u></li> </ul>  |
| <b>Notes</b>               | -  | -  | -  | -   | -   |

# X-band klystron under MIN investigation

- One of the X-band klystron filament is under MIN investigation → Do not start X-band system for the moment.

mod\_scandinova\_xpert\_sinbad\_TDS.xml SINBAD.RF/MODULATOR.TDS/TDS1/

**SINBAD Xpert TDS1** Print

Server Status: ok Restart Server

**H** Idle (neither GUI nor Modbus)

State: OFF

TRIG **H** RESET **H** 0

HV ON

STDBY

OFF

Charge Voltage  V **H**

Pulse Width   $\mu$ s **H**

Pulse Voltage 0.00 kV **H**

Pulse Current 0.00 A **H**

Filament wait time 0.00 s **H**

Rep Rate 10 Hz **H**

Soleniod Current 0.00 A **H**

Soleniod Voltage 0.02 V **H**

Charge Voltage 1 0.00 V **H**

Charge Interlock 1 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Charge Voltage 2 0.00 V **H**

Charge Interlock 2 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

Charge Voltage 3 0.00 V **H**

Charge Interlock 3 ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐

**Filament Voltage 0.02 V **H****

**Filament Current 0.02 A **H****

Oil Temperature 27.09  $^{\circ}$ C **H**

Oil Level -16.49 mm **H**

Tank BPS Voltage Set 5.10 V **H**

Cool CCPS Flow 1 5.40 l/m **H**

Cool CCPS Flow 2 5.43 l/m **H**

Cool CCPS Flow 3 5.38 l/m **H**

Cool Solenoid Flow 10.54 l/m **H**

Cool Collector Flow 16.45 l/m **H**

Cool Body Flow 8.41 l/m **H**

Current Flags Event Log

https://jddd-sinbad.desy.de/jddd/SINBAD.RF/mod\_scandinova\_events\_sinbad.xml SINBAD.RF/MODULATOR.TDS/TDS1/\*

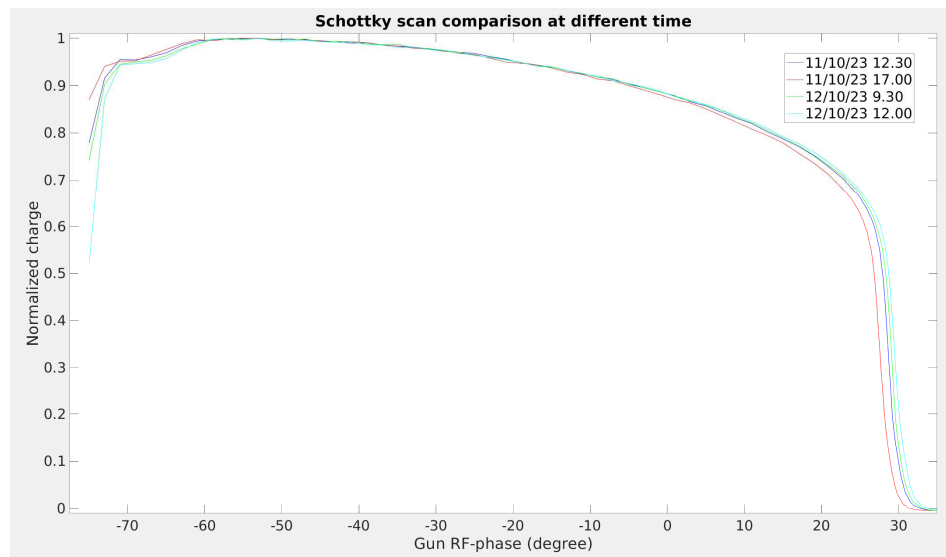
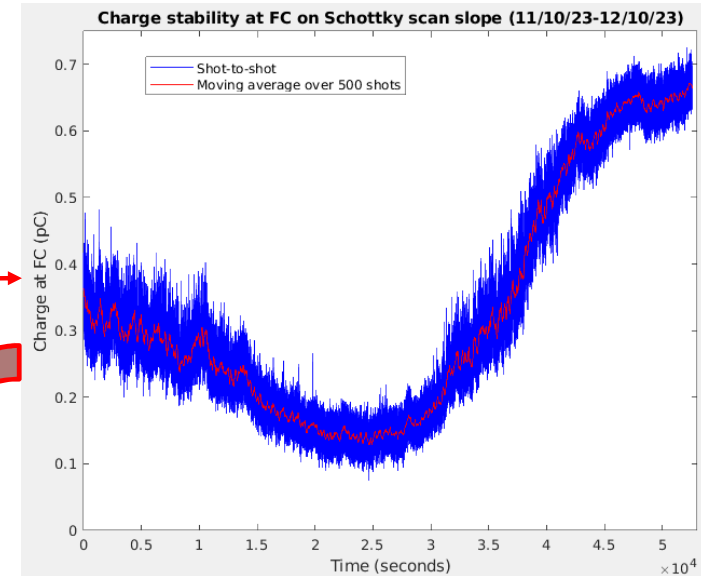
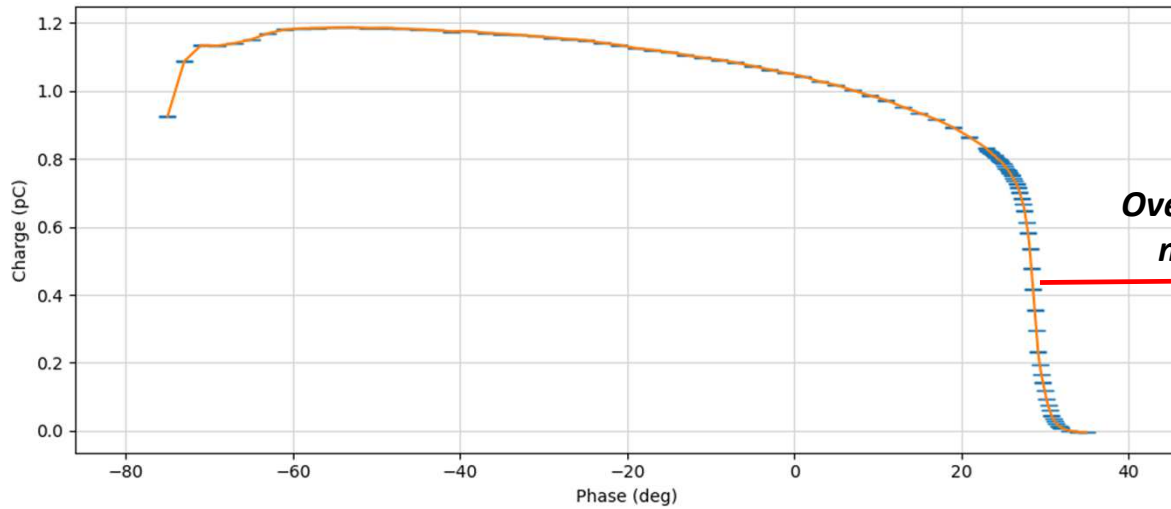
**SINBAD TDS1**

| msec  | DATE                       | EVENT                                   |
|-------|----------------------------|---|
| 682.0 | 11. Oct. 2023 10:40:03.000 | Interlock Tank\OilPumpTempSts\HIGH I... |
| 686.0 | 11. Oct. 2023 10:40:03.000 | State Off                               |
| 695.0 | 11. Oct. 2023 10:40:03.000 | State Off                               |
| 681.0 | 11. Oct. 2023 10:29:21.000 | State StandByOnRequested                |
| 632.0 | 11. Oct. 2023 10:29:10.000 | State StandByOnRequested                |
| 642.0 | 11. Oct. 2023 10:29:10.000 | State Off                               |
| 283.0 | 09. Oct. 2023 18:39:04.000 | Interlock Tank\OilPumpTempSts\HIGH I... |
| 290.0 | 09. Oct. 2023 18:39:04.000 | State Off                               |
| 300.0 | 09. Oct. 2023 18:39:04.000 | State Off                               |
| 328.0 | 06. Oct. 2023 16:20:22.000 | State StandBy                           |
| 298.0 | 06. Oct. 2023 16:20:15.000 | State TrigOffRequested                  |
| 308.0 | 06. Oct. 2023 16:20:15.000 | State Hv                                |
| 318.0 | 06. Oct. 2023 16:20:15.000 | State HvOffRequested                    |
| 795.0 | 06. Oct. 2023 15:28:18.000 | State Hv                                |
| 805.0 | 06. Oct. 2023 15:28:18.000 | State TrigOnRequested                   |
| 815.0 | 06. Oct. 2023 15:28:18.000 | State Trig                              |
| 786.0 | 06. Oct. 2023 15:28:06.000 | State HvOnRequested                     |
| 819.0 | 06. Oct. 2023 15:27:07.000 | Interlock CCPS\Ps3SumSts\Input missi... |
| 821.0 | 06. Oct. 2023 15:27:07.000 | State StandBy                           |
| 696.0 | 06. Oct. 2023 15:21:39.000 | State Hv                                |
| 706.0 | 06. Oct. 2023 15:21:39.000 | State TrigOnRequested                   |
| 716.0 | 06. Oct. 2023 15:21:39.000 | State Trig                              |
| 688.0 | 06. Oct. 2023 15:21:27.000 | State HvOnRequested                     |
| 681.0 | 06. Oct. 2023 15:20:45.000 | Interlock CCPS\Ps3SumSts\Input missi... |
| 681.0 | 06. Oct. 2023 15:20:45.000 | State StandBy                           |
| 255.0 | 06. Oct. 2023 15:11:33.000 | State Hv                                |
| 265.0 | 06. Oct. 2023 15:11:33.000 | State TrigOnRequested                   |

Goes too high → Interlock

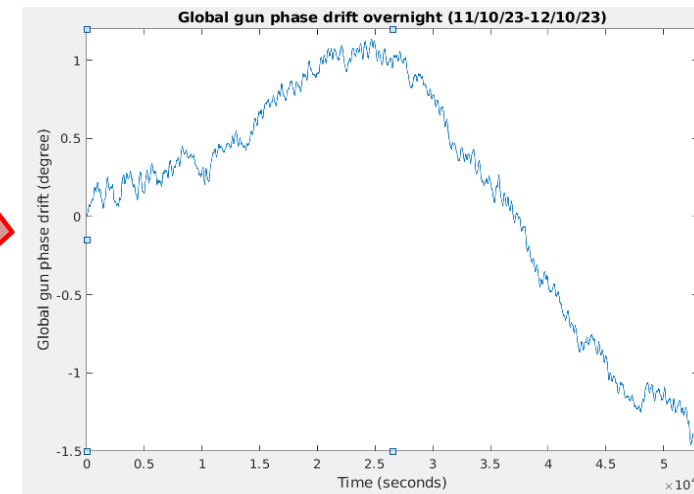
Wrong

# Investigation on global gun phase drift (1/2)



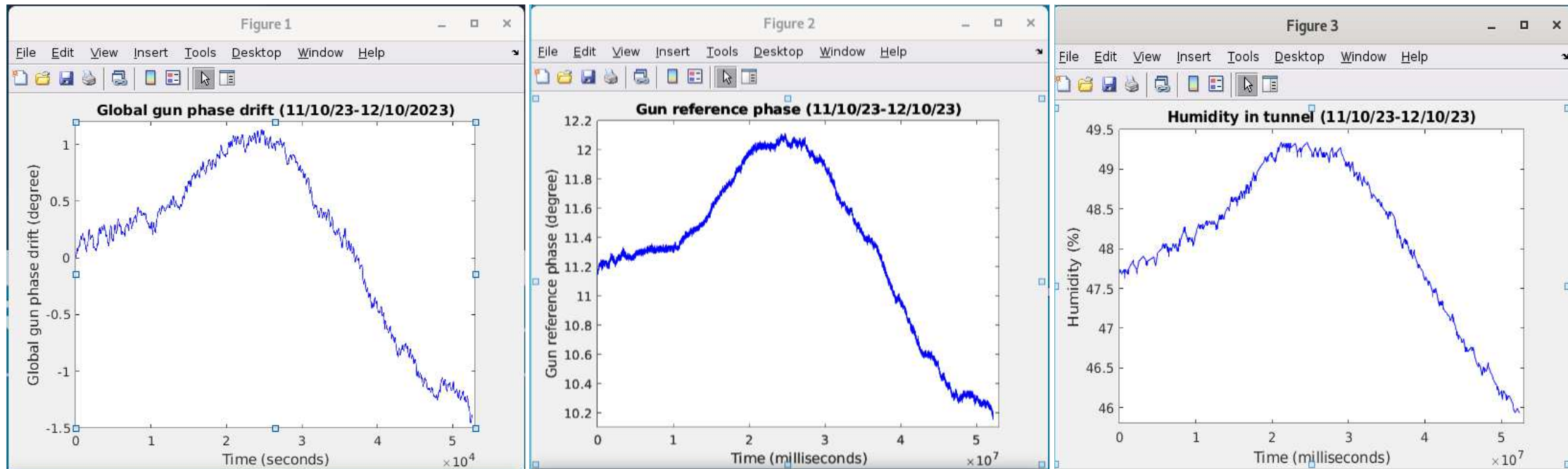
Interpolating from  
Schottky scan

**Note: Global gun phase refers here to the combination of RF phase and laser timing**



# Investigation on global gun phase drift (2/2)

- Searching for correlations of the global gun phase drift, 2 clear ones appear: gun reference phase and humidity. Investigations from MSK and laser group are needed to further pin down the cause of the drift.



# Cathode laser angle moved significantly

[https://jddd-sinbad.desy.de/jddd/SINBAD/Injector/Laser/PC\\_Laser\\_SINBAD.xml](https://jddd-sinbad.desy.de/jddd/SINBAD/Injector/Laser/PC_Laser_SINBAD.xml) ///

## SINBAD Photocathode Laser

Laser Controls   **BEAM at GUN**   Cams Gun   Laser Synchronisation   Pulse Shot Mode

### UV auto beam alignment

GUN\_VC

Profile X

Profile Y

Camera ROI

ShowBeamposition

GUN\_VC\_ANG

Profile X

Profile Y

Camera ROI

| Nearfield |         | Farfield |         |
|-----------|---------|----------|---------|
| Target    | Current | Target   | Current |
| X 1055    | 1052.6  | 775      | 817.4   |
| Y 675     | 674.6   | 536      | 539.2   |

Error Thresh. 2.1 2.1

Time-To-Target 1.0E4s

NF Data Available ●   FF Data Available ●  
Motor Controller ●   Motion Done ●

Server Status: ok   Modes

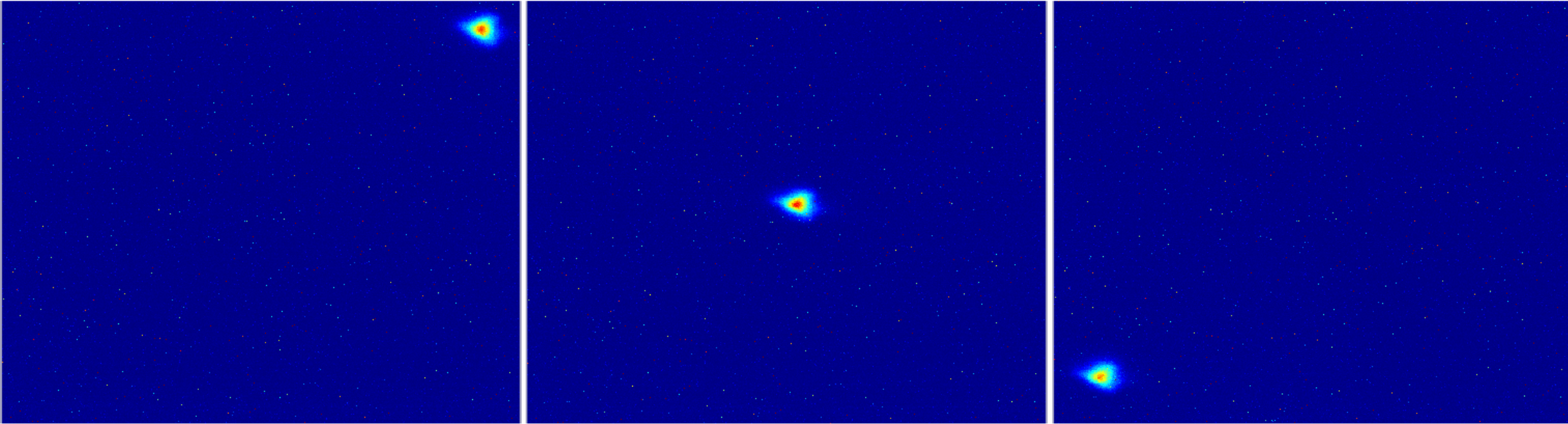
Max. Step Size 10

**Align.**   **Stab.**

Picomotors control



## D1 screen station tests



d1\_x\_sig = 0.188 +- 0.002 mm  
d1\_y\_sig = 0.416 +- 0.006 mm  
d1\_x\_fwhm = 0.140 +- 0.002 mm  
d1\_y\_fwhm = 0.319 +- 0.005 mm

e2\_x\_sig = 0.196 +- 0.002 mm  
e2\_y\_sig = 0.430 +- 0.005 mm  
e2\_x\_fwhm = 0.138 +- 0.002 mm  
e2\_y\_fwhm = 0.315 +- 0.005 mm

# BPM studies



- 2.6 pC beam, signal observed on BPM between the two TWS
- Yellow: TWS2 on and at full power
- Blue: TWS2 off
- Noise is induced by RF power in TWS2 (not pre-amp or modulator alone) and increases with it
- Variation with vacuum level in TWS2 also observed (likely due to power variation)
- More investigation required

# Plan for KW42

- MON: X-band klystron check (MIN); USV yearly check; Work on grounding net ; ICT cable installation (MDI)
- TUE-WED: AA shift (Jan)
- THU: MDI beam time (ICT tests and maybe BPM tests)
- FRI: To be seen



# Schedule

Week 42

| Date   | Shift leader          |
|--------|-----------------------|
| 16.10. | Florian (Tunnel open) |
| 17.10. | Florian/Frank         |
| 18.10. | Frank/Florian         |
| 19.10. | Hannes                |
| 20.10. | To be seen            |

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