GUN 3.1 CONDITIONING RUN







IΤ

Photo Injector Test Facility

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1. Rep. Rate. 5 Hz, RF pulse length 10 μ s, RF power from 0 to Max (5 MW) 2. Rep. Rate. 5 Hz, RF pulse length 20 μ s, RF power from 0 to Max (5 MW) 3. Rep. Rate. 5 Hz, RF pulse length 50 μ s, RF power from 0 to Max (5 MW) 4. Rep. Rate. 5 Hz, RF pulse length 100 μ s, RF power from 0 to Max (5 MW) 5. Rep. Rate. 10 Hz, RF pulse length 10 μ s, RF power from 0 to Max (5 MW) 6. Rep. Rate. 10 Hz, RF pulse length 100 μ s, RF power from 0 to Max (5 MW) 7. Rep. Rate. 10 Hz, RF pulse length 200 μ s, RF power from 0 to Max (5 MW) 8. Rep. Rate. 10 Hz, RF pulse length 400 μ s, RF power from 0 to Max (5 MW) 9. Rep. Rate. 10 Hz, RF pulse length 400 μ s, RF power from 0 to Max (5 MW) 10. Rep. Rate. 10 Hz, RF pulse length 650 μ s, RF power from 0 to Max (5 MW)

- Increase in steps of 0.2MW pro 15 min.
- After an IL event, switch off FEEDFORWARD, REDUCE THE POWER, REDUCE THE PULSE LENGTH and start with 1 if <5 and can skip intermediate stages; with 5 if >=5 don't skip any stage

- 1-2-3-IL-1-3-4-5-6-7-IL-5-6-7-8-IL-5-6-7-8-9-10

GOAL: stable operation at >4MW with 830us (FLASH), at >6MW with 650us Yevgeniy Ivanisenko | Run coordination | 09/11/12 | Page 2 (XFEL)





- NO feedback
- 0 us rise/fall times for 10us pulses, for longer pulses and power above 3MW use about rise/fall=10us. Observe the waveguides, sparks, SF6 IL.
- Use low modulator HV to avoid accidental high power increase in one step.
- Use the possibility to limit the RF pulse length to avoid accidental large change at once. The limit can be changed only by our RF crew.

Solenoids OFF

- If succeeded with solenoid off, then solenoid sweeping and the whole program once more
- In case of high vacuum activity at 5 Hz, switch back to 2 Hz
- Vacuum < 10e-7 mbar @ GUN.PG1 (a critical parameter for the RF Window).
- Keep an eye on the readout of the new sensors on the RF window:
 - Photodiode, e-detector, IR detector, vacuum, PM
 - more information (where to find) to be distributed later.

SOLID DOCUMENTAION OF IL EVENTS



- Each IL event has to be understood and snapshots printed to the logbook before resetting it.
- There are two persons on shift. Use this advantage:

pitz <@blade83.ifh.de>

RF1 -> booster

logbook PITZ

timing

tools

help

why?

overview adc modules

beam inhibit system DAQ (NOT bubo)

> diagnostic interlock laser beam line new laser magnets

radiation protection

vacuun water cooling system other alarms IBPC operating time: 13334 48002871

watchdog

FSM

RF2 -> gun

climate overvie

shift window

snapshot to logbook PITZ

settings to logbook PITZ

Save&Restore - Tool

system

why?

While one operator is restoring the gun operation after the IL, the other one writes a detailed - 0 × description of the IL event and extracts the PITZ Control ? spectra of the detectors from DAQ if applicable

🗙 pitz_tools <@blade83.ifh.de> 📃 🗅					
PITZ tools					
Charge & Laser Energy Measurement					
Phase Scan		Dar	Dark current scan		
LOW.ICT1 HIGH1.	HIGH1.ICT1 HIGH		HIGH2.ICT1	LSR.PM	
Wirescanners					
Make QEmap History		ry Tool	History As text		
daqpr daqpr_S		_Spectr	Spectr SpectrROOTM		
Start wi					



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There will be a data logging Matlab script to save all conditioning relevant data, it must be running all the time during the conditioning.

- /doocs/measure/Conditioning/_MatlabScripts/monitoring of signals/gun_parameter_monitoring.m
- > Think thrice and cut once. Be responsible.
 - a window and a gun were once killed by accidentally applying too long RF pulse for a short period of time.

If the conditioning progress stops and the maximum power cannot be reached, operators must contact responsible persons for a decision to be made. (F. Stephan, M. Krasilnikov, A. Oppelt, S. Schreiber, S. Lederer, Y. Ivanisenko).

The appetite comes with eating – the conditioning information will get extended and modified along with the experience we will collect. Your comments and suggestions are very much welcome.