

GUN 3.1 CONDITIONING RUN

Yevgeniy Ivanisenko
Run coordination,
2012-11-08

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 650 μ s, RF power from 0 to Max (5 MW)
10. Rep. Rate. 10 Hz, RF pulse length 830 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 (XFEL)**

> RF

- 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

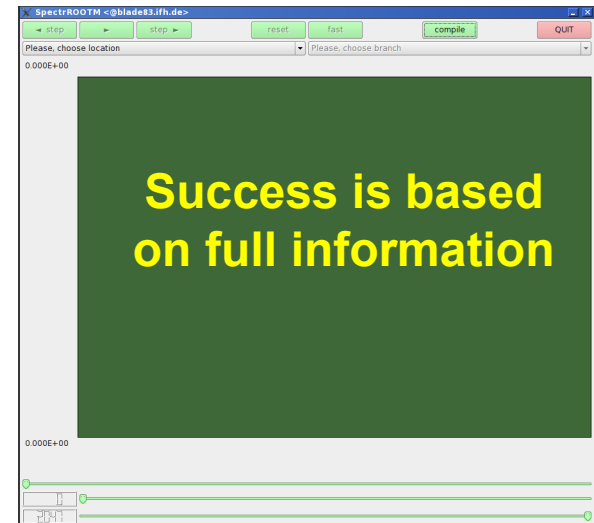
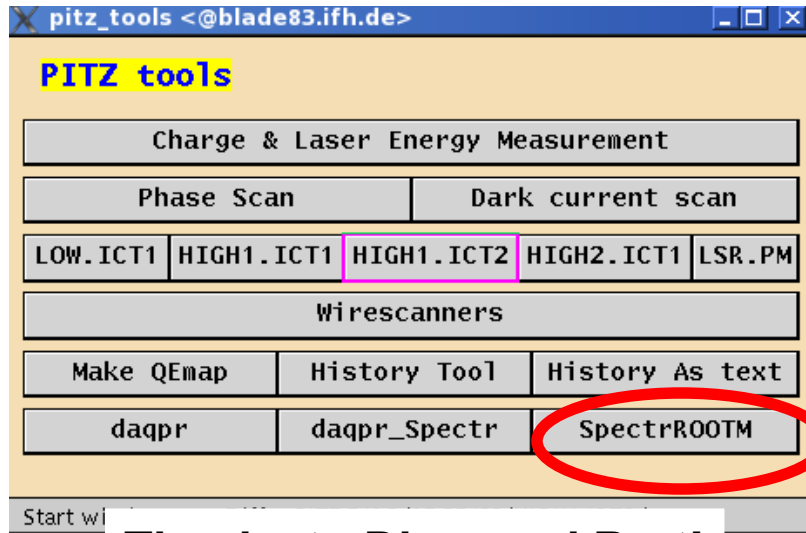
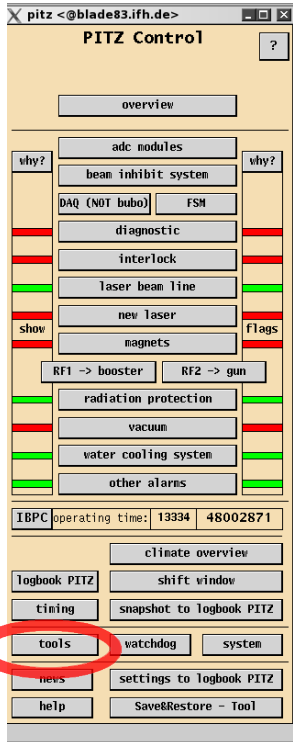
> In case of high vacuum activity at 5 Hz, switch back to 2 Hz

> 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.

- > 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:
 - While one operator is restoring the gun operation after the IL, the other one writes a detailed description of the IL event and extracts the spectra of the detectors from DAQ if applicable



- **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.**