Automation of the Gun

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GUN at FLASH

- normal conducting cavity
- power dissipation 5-50kW
- -21kHz / °C
- operating temperature ~59°C
- Iris temperature stabilized by water cooling
  - works perfectly in steady-state conditions
  - long transients when RF power fluctuates
Gun temperature regulation
GUN temperature & klystron power (steady-state, FF+FB)
Gun control in transients
RF control for the Gun

- FF tables are calculated by Gun DOOCS server according to requested operating conditions and uploaded to the controller (SimCon FPGA).
- For changing frequency of RF power one need to modulate FF tables.
Calculated FF table for detuning 0Hz
Calculated FF table for detuning 4kHz
Gun DOOCS server
(after modifications)

- TTF2.RF/LLRF.FPGA/GUN
  - FFORWARD_I
  - FFORWARD_Q
    - FF table
      (related to the SP)
      I & Q
        read only
      - user FF table
        I & Q
  - RAW_SP_FF
  - RAW_TAB_SW
    - controller output
Matlab GUI for Gun control
Gun startup (1)
Gun startup (2)
Gun startup (3)
Conclusion

• DOOCS server equipped with user FF tables functionality
• Matlab GUI for automatic and manual control of the Gun
• prepared Matlab script for Gun startup
• several startup-strategies tested, more will be tested