PITZ interlock system

Short overview

HELMHOLTZ GEMEINSCHAFT

DESY

IL system of PITZ

- The PITZ gun IL system is designed to protect the accelerator from damage. It quickly stops llrf driver.
- The PITZ IL system **reaction time is in a range of a few microseconds → RF can be stopped within the RF pulse**.
- IL system collect signals from all IL devices and produces a common IL signal which stops the RF power

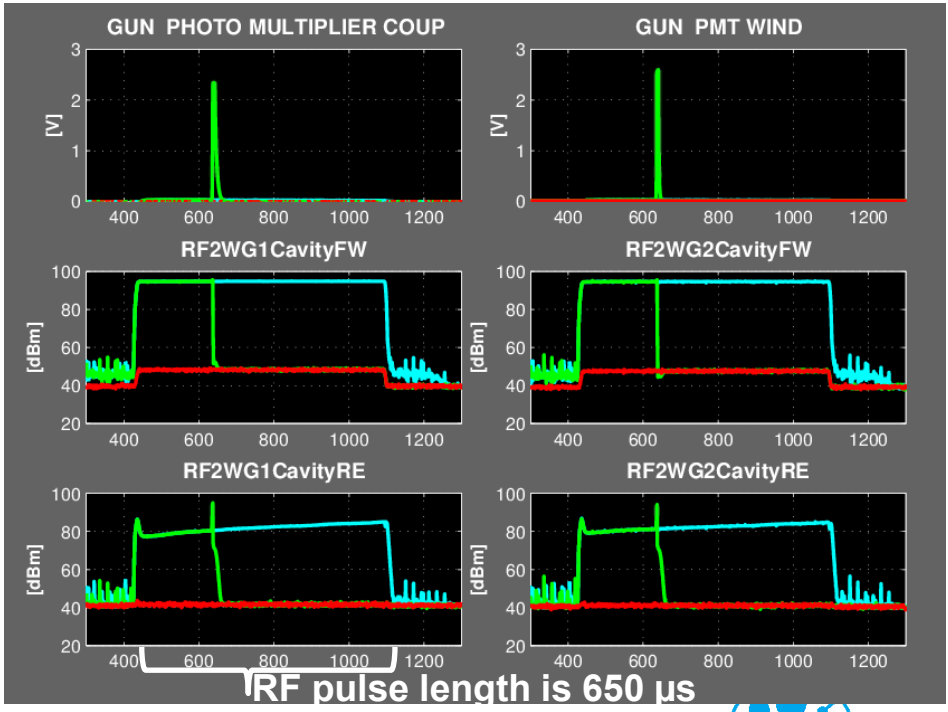
Undisturbed RF pulse →

→ IL event detected →

→ RF pulse interrupted →

→ Signals after IL event

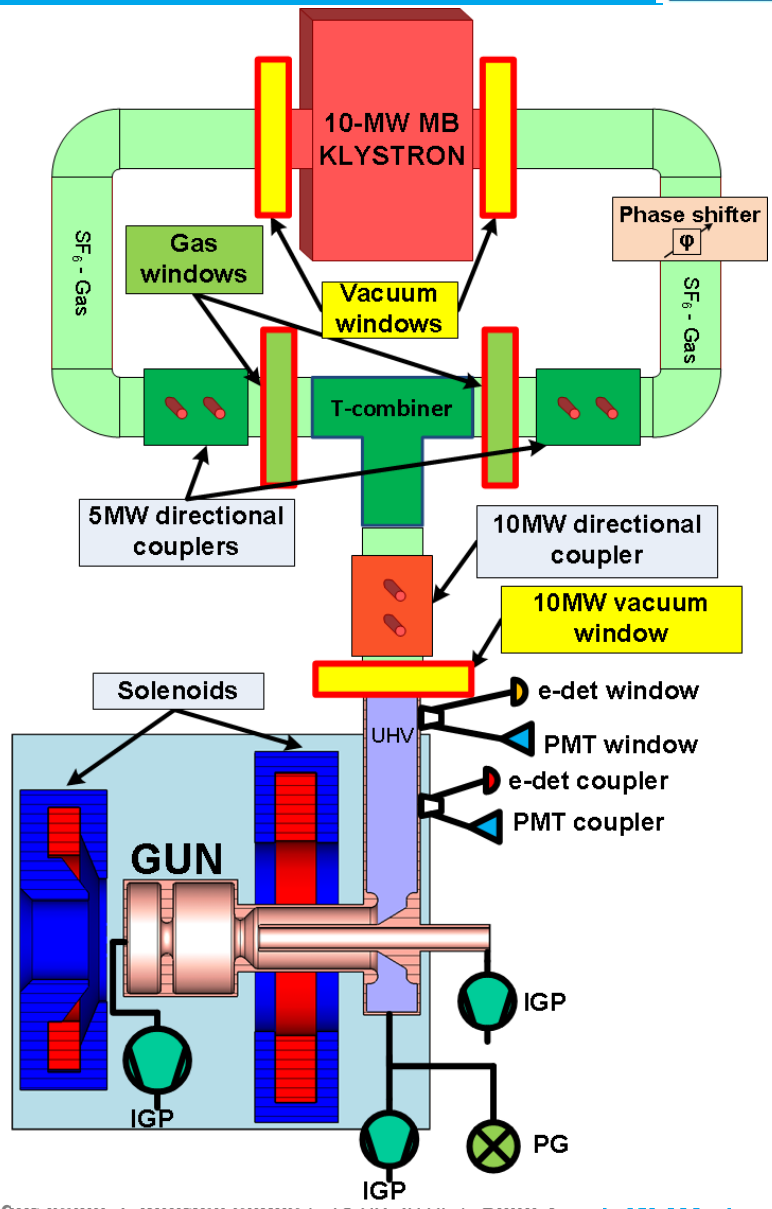
(RF is off)



RF system layout and IL detectors arrangement for Gun 4.3 / Gun 4.4 at PITZ

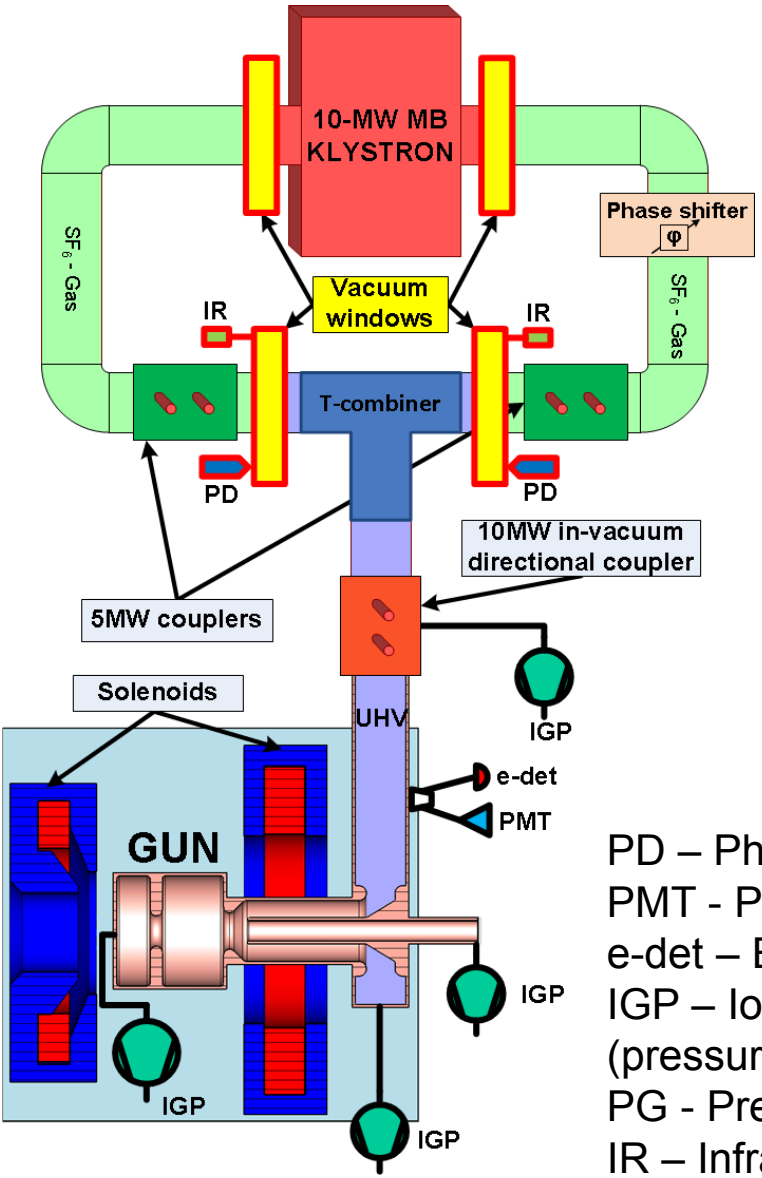
Interlock detector types:

- **PMT** - Photomultiplier tubes:
  at the vacuum window and the coupler
- **e-det** – Electron detectors:
  at the vacuum window and the coupler
- **Vacuum detectors:**
  - **IGP with TSP** – Ion Getter Pump installed after Titanium Sublimation Pump: vacuum pressure reading in the gun region (by IGP)
  - **IGP** direct installation (depends on setup)– Ion getter pump installed directly after a vacuum chamber
  - **PG** - Pressure gauge
- **Spark detectors** (not shown) - spread along the RF waveguide distribution system
- **IR sensors** (not shown) – Infrared sensors: were installed on the gas side of DESY type RF windows
- **Temperature sensors** (not shown) – spread along the RF waveguide distribution system, gun body, vacuum windows, cooling water pipes
- **Water flow meters** (not shown) – are located in different parts of the cooling water system



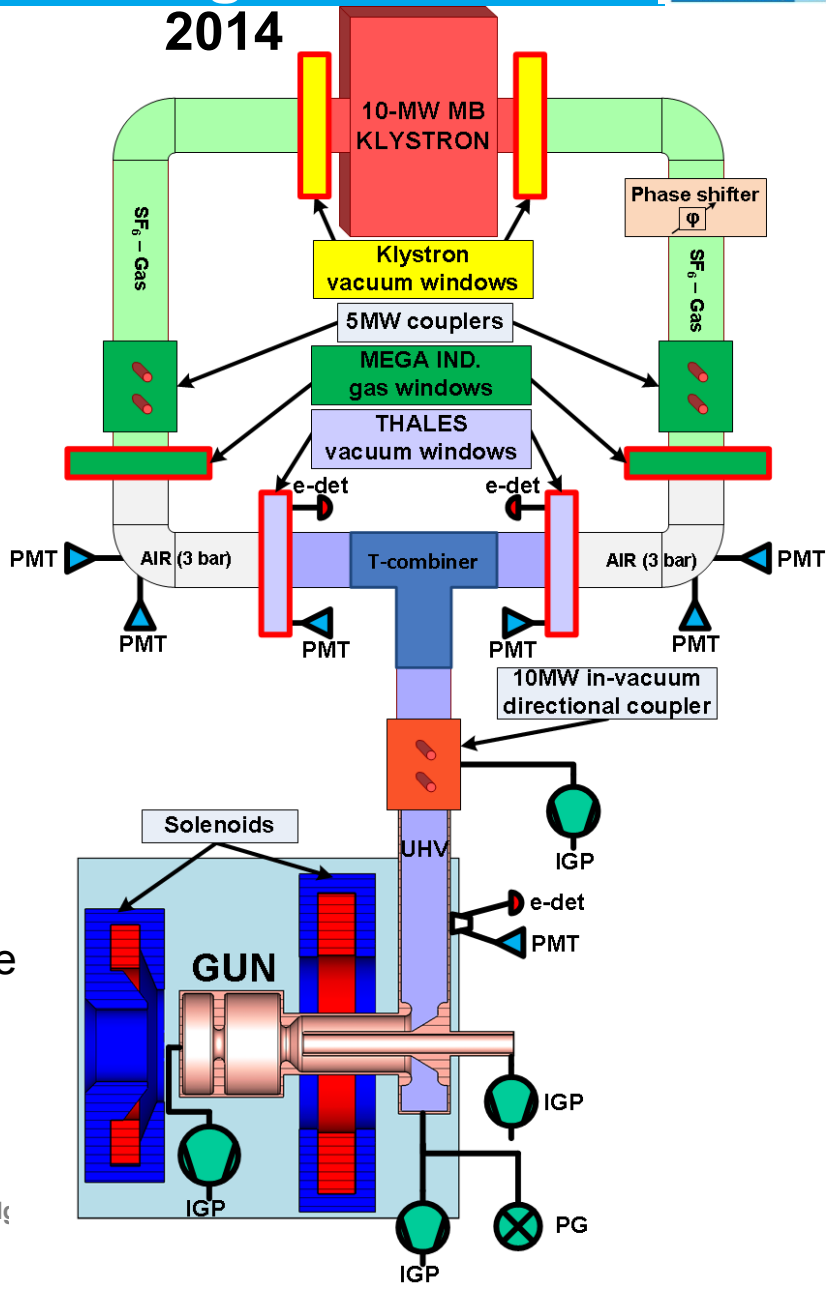
Other schemes of RF system layout and IL detectors arrangement

until June 2012



PD – Photodiode
PMT - Photomultiplier tube
e-det – Electron detector
IGP – Ion getter pump (pressure reading)
PG - Pressure gauge
IR – Infrared detector

2014



Reaction time of IL system

The PITZ IL system consists of 2 types IL detectors:

- Fast IL detectors: PMT, electron detector, photodiode, spark detector, maximum reflected power... The data transfer for these detectors is organized by fast transfer data protocols with using of optical cables.
- Slow IL detectors: IGP, PG, IR sensor, temperature detector, flow detector… The data transfer is organized by normal speed transfer data protocols.

The reaction time of IL system for all of these detectors is below 5 µs