

PAUL SCHERRER INSTITUT



**Nos creare scientia hodie ad cras**

# **Proton Irradiation Facility Summary 2016**

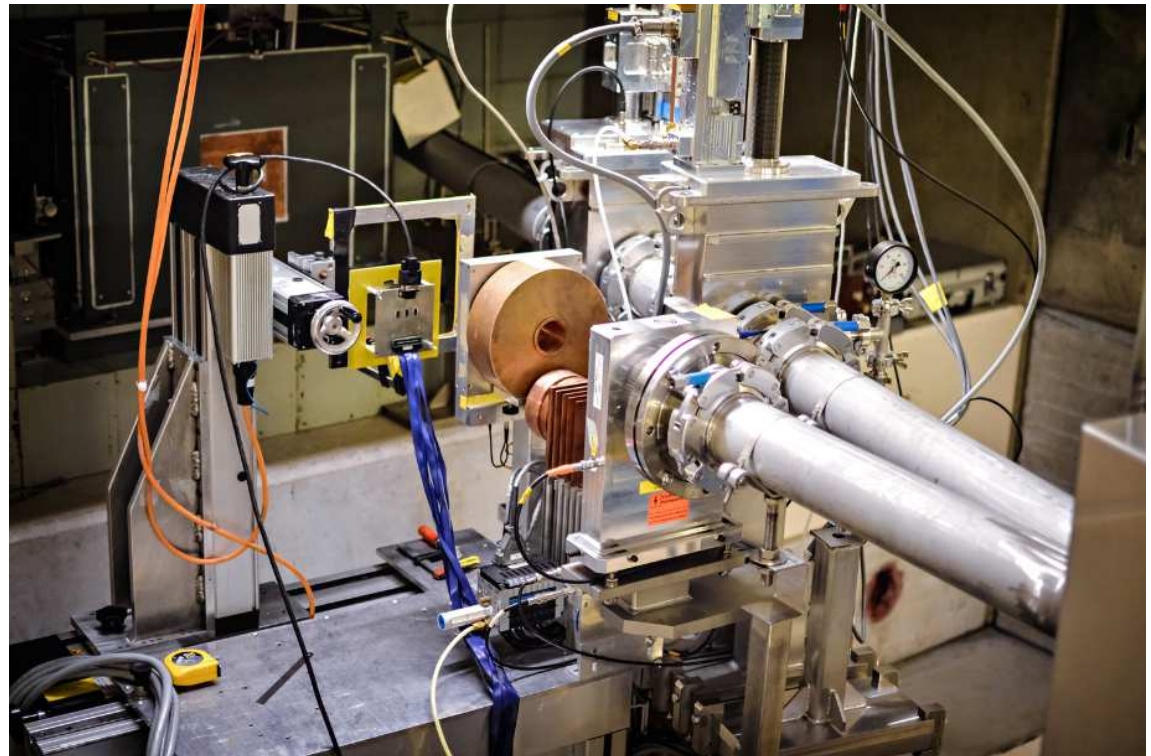
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ESA-CNES FPD, Noordwijk, 6-9 Mar 2017

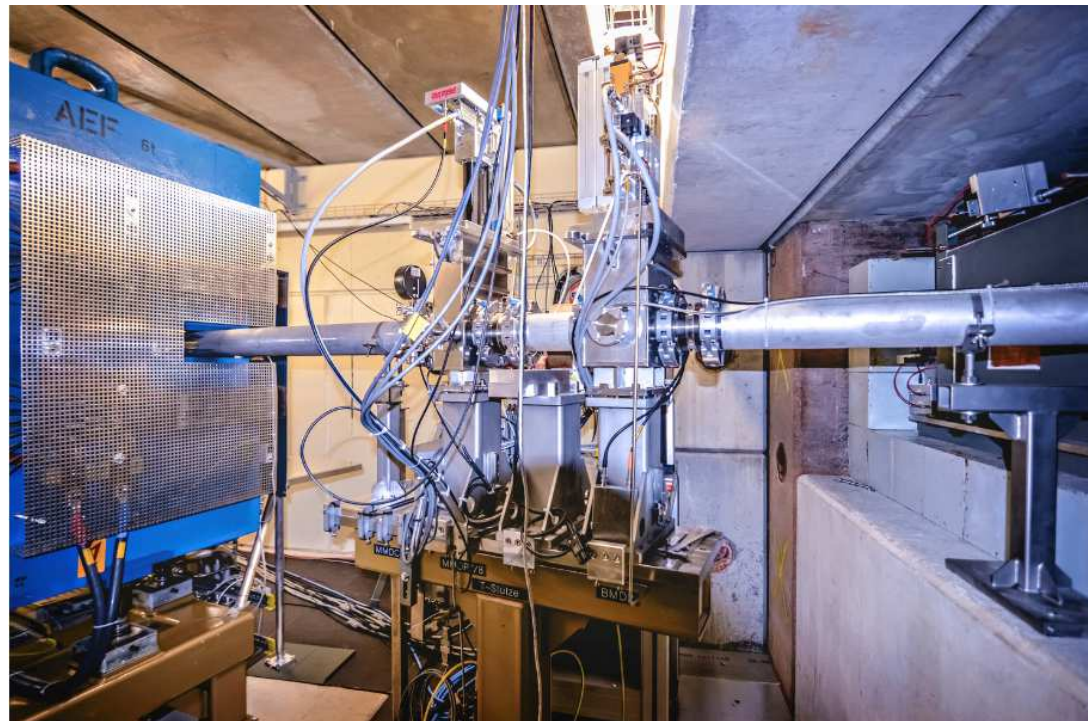
1. Operation flow in 2016 during GANTRY3 project
2. Further upgrades of PIF after reconstruction
3. Low intensity proton beams
4. Electron beams optimization
5. Statistical data for PIF operation

- Operation continued smoothly
- Extra tasks with Gantry3 area safety
- Gantry3 still under commissioning
  - Some night shifts at weekends
  - All week night shifts
  - Until in summer 2017

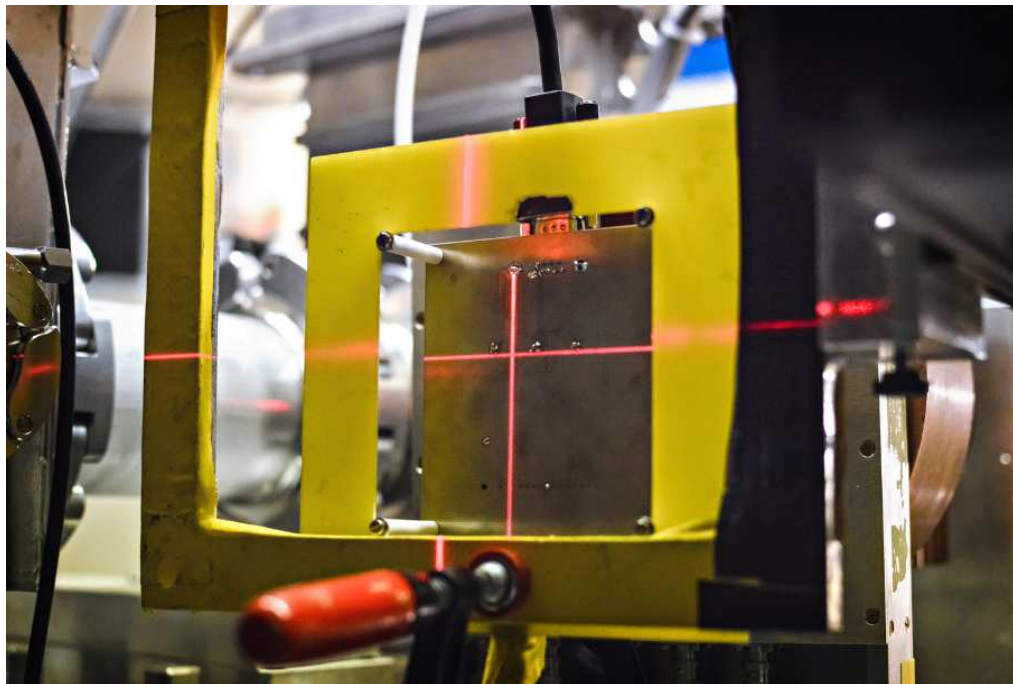


*PIF XY-table, beamdump, dosimetry*

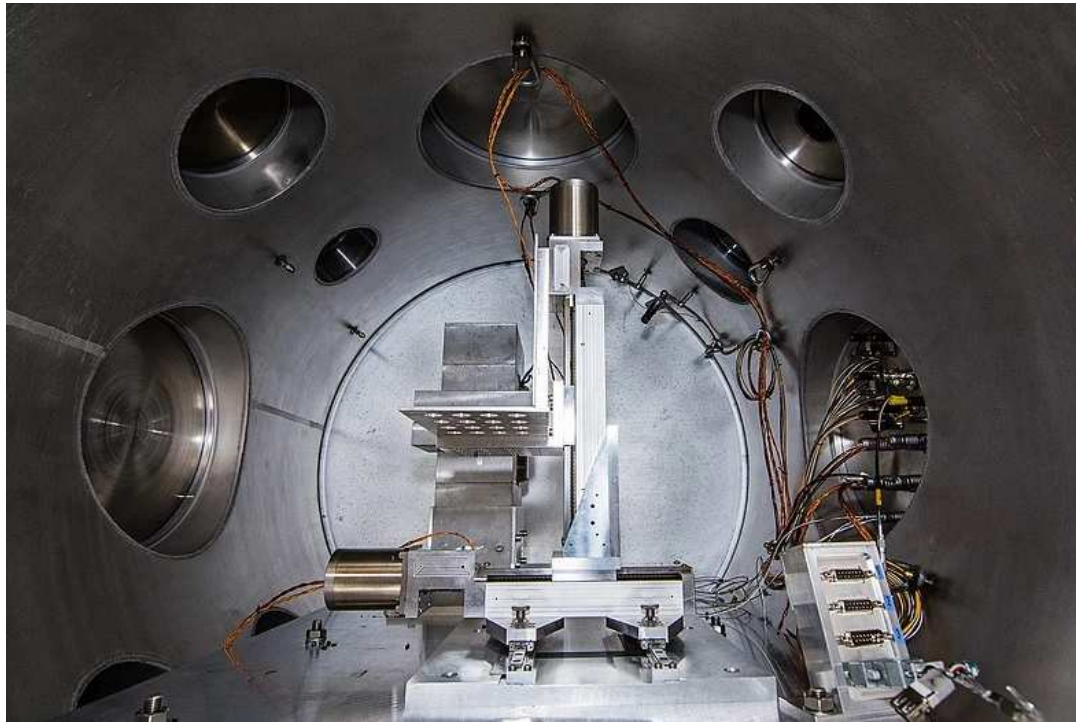
- Stabilization of XY-table /floor
- Optimized setup for 230 MeV beams
- Dedicated Si-diode dosimetry
  - Low intensity beams
- Routine use of ESA SEU Monitor
  - Stable beam conditions
- Better shielding of bending magnet
  - User protection, new table
- New TV-cameras
  - Radiation damage failure
  - Web accessible
- Fluorescence foil for beam centering



- Dedicated Si-detector constructed
- Flexible mounting system/various locations
- Readout electronics suited to PIF DAQ
- Accurate studies of used Si-diodes
  - Focused and wide beams at 230 MeV
  - Adaptation of small vacuum chamber
  - Permanent magnets as monochromators

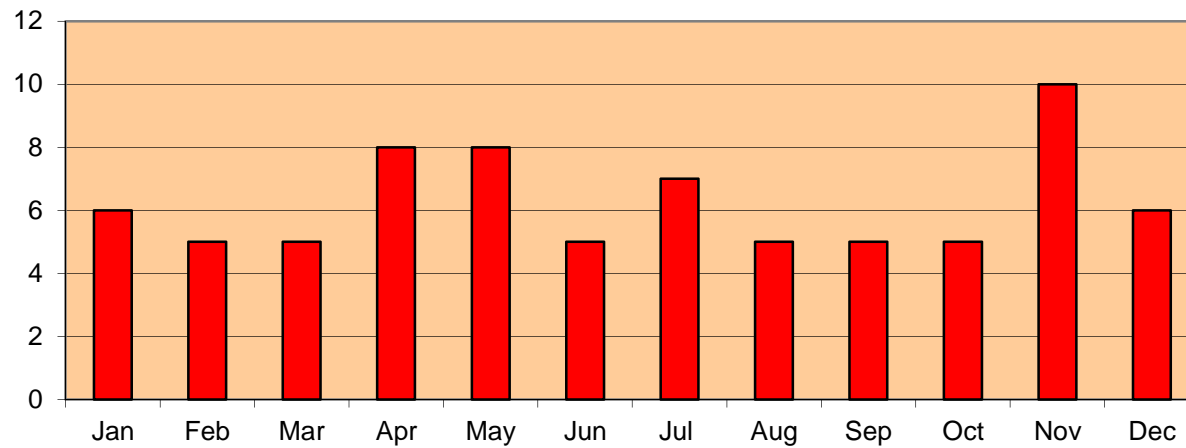


- Precise characterization of electrons beams in EMON
- Wide range XY – scanning / profiling
- Beam flux measurements as function of distance from beam exit
- Determination of centricity
- Source uniformity studies

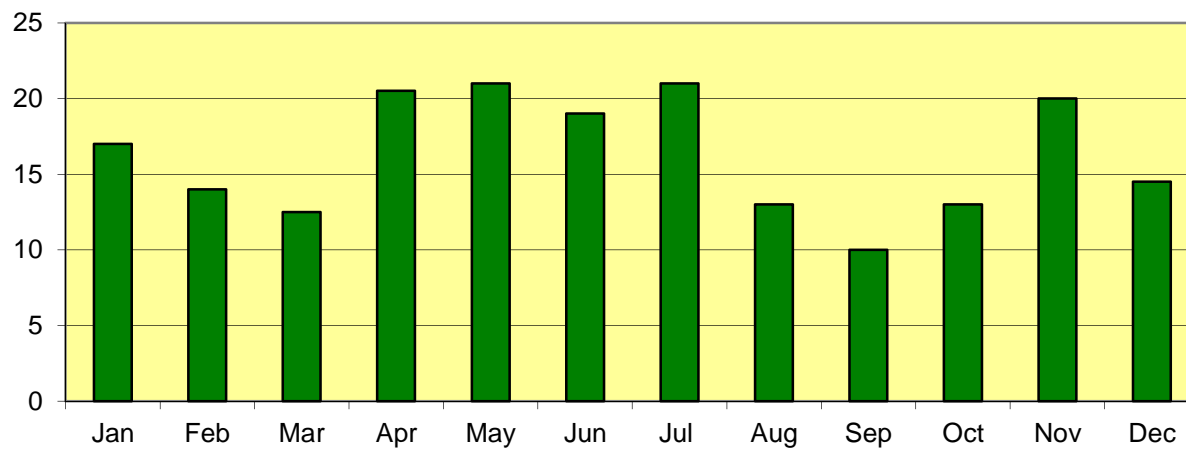


<i>Beam hours (flat)</i>	-	1564
<i>Test days</i>	-	153
<i>Shifts</i>	-	196
<i>Experiments</i>	-	74
<i>Institutions</i>	-	> 35
<i>Users</i>	-	> 190
<i>ESA related shifts</i>	~	128
<i>ESA pool shift</i>	~	31

**Experiments per month 2016**

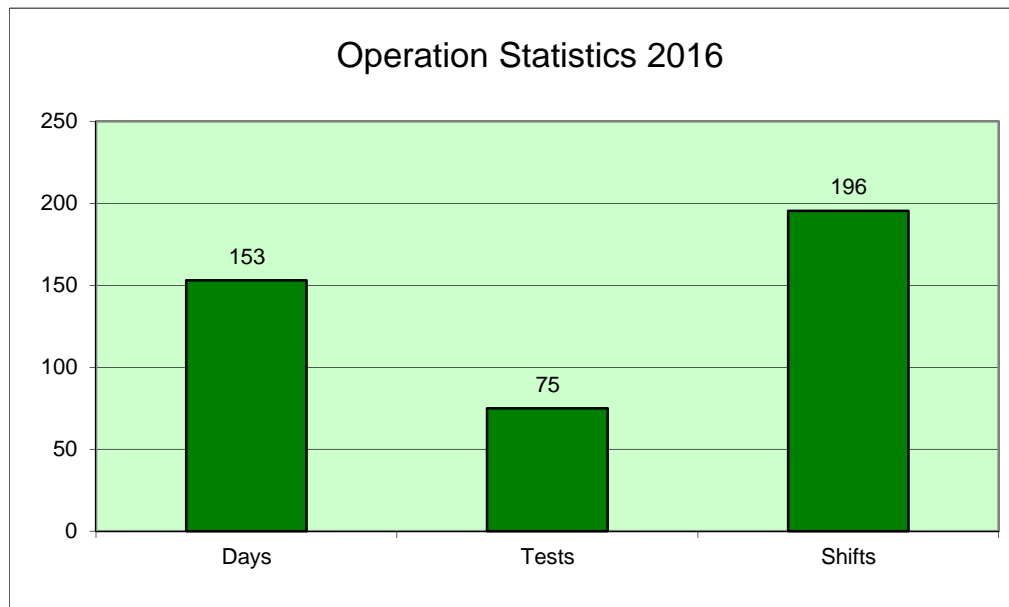


**Beam shift per month 2016**





	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31		
Jan																																	
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1. Continuous PIF operation in 2016 despite Gantry3 commissioning
2. Extended use of EMON for electron tests (NGRM, RADEM etc.)
3. No use of piM1 area as several group had delays
4. Several improvements / upgrades implemented
5. Lower and higher energies expansion (~2.5 – 230 MeV, ongoing)
6. Highly focused beams for tests at large dose rates ( $10^2$ - $5 \cdot 10^9$  /cm<sup>2</sup>/s)
7. After Gantry3 commissioning more weeks shift foreseen

Thank You



## The Gamma-Ray



*GRIPS*

*GRIPS*