

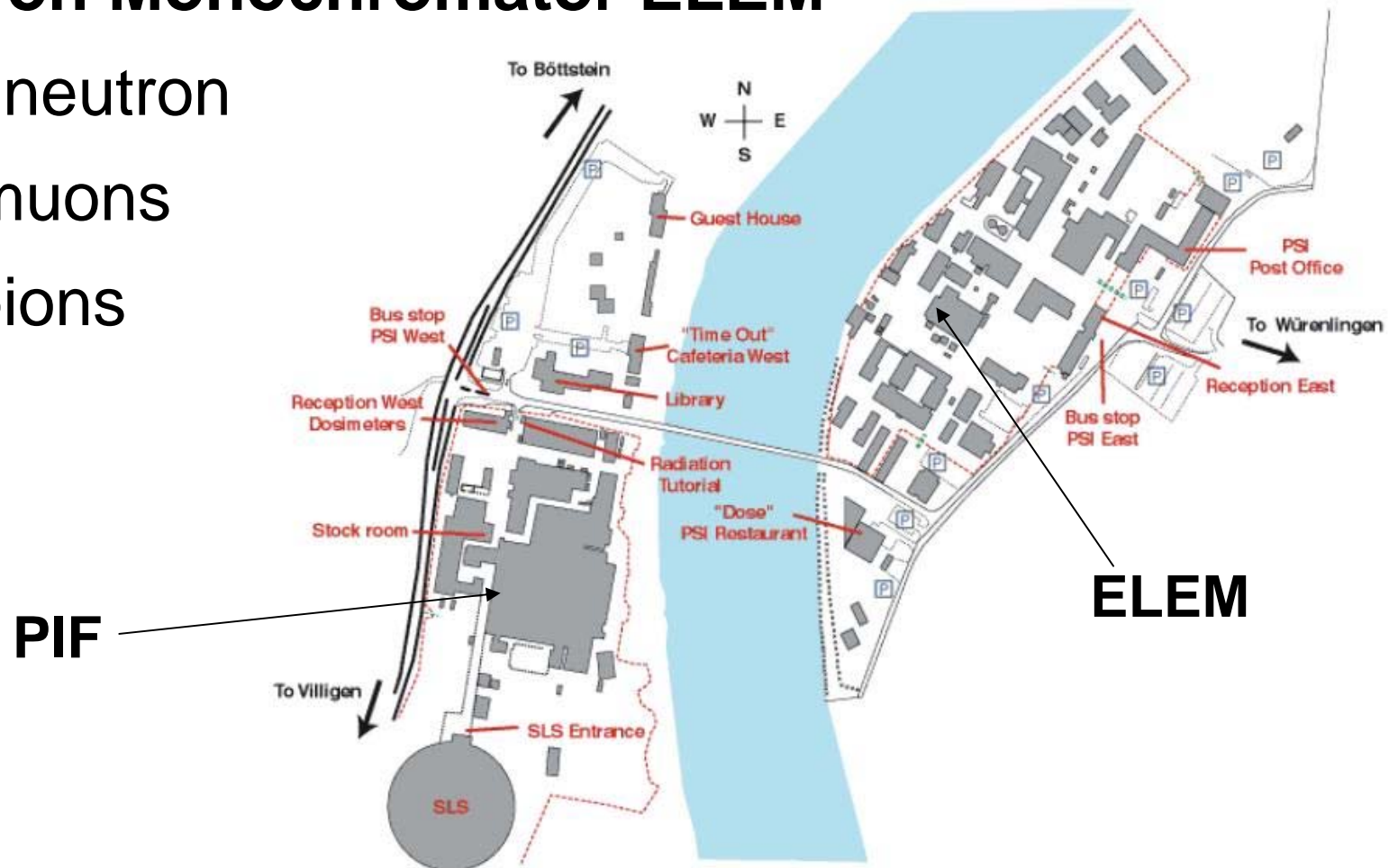
Produkujemy wiedzę – dzisiaj na jutro

# Proton Irradiation Facility PIF Status Report 2010

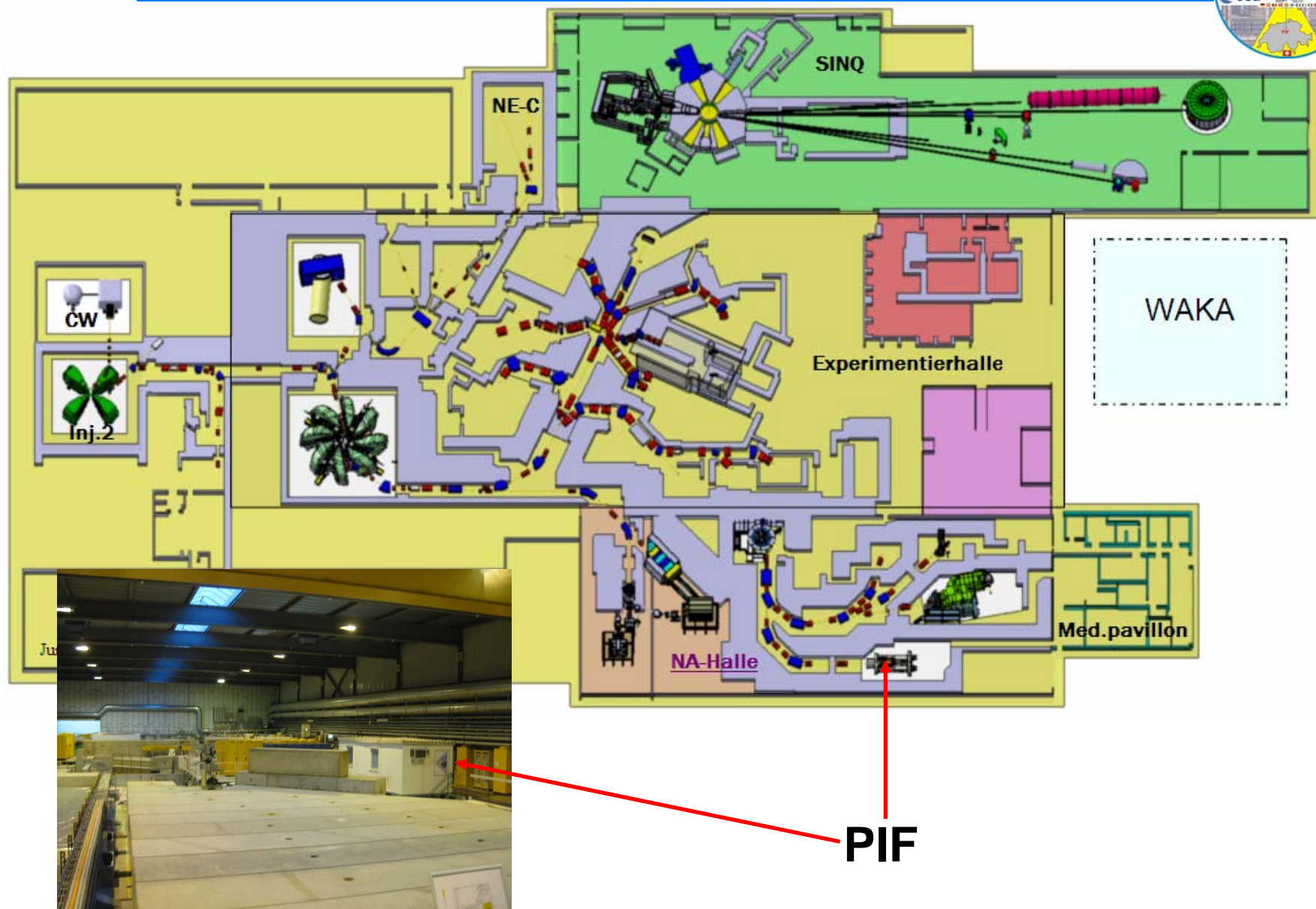
Wojtek Hajdas



1. Proton Irradiation Facility PIF
2. Electron Monochromator ELEM
3. SINQ neutron
4. uSR muons
5. SLS pions

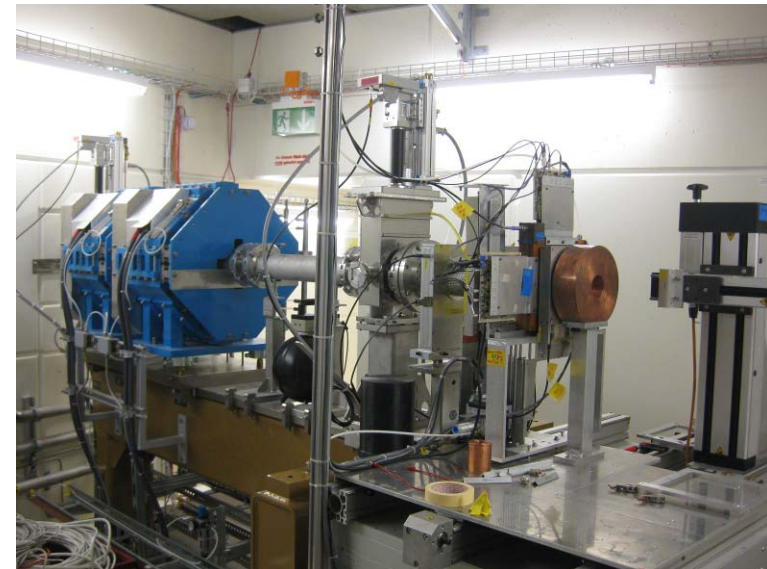
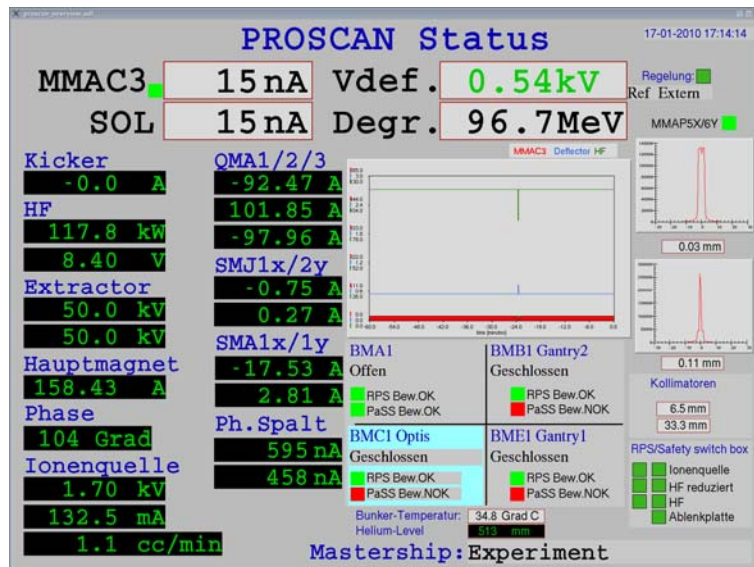
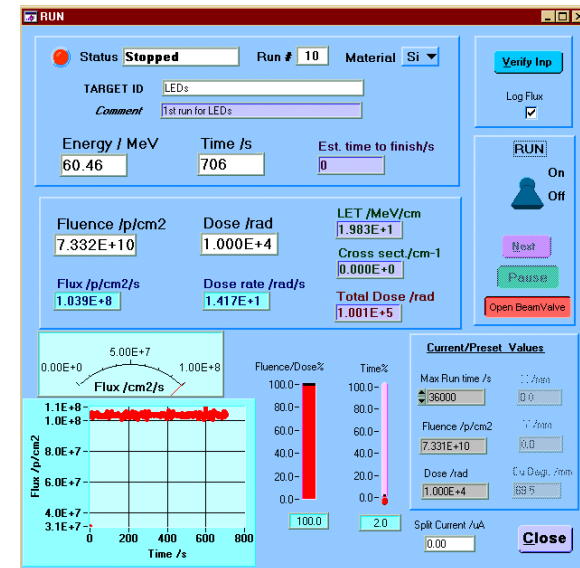




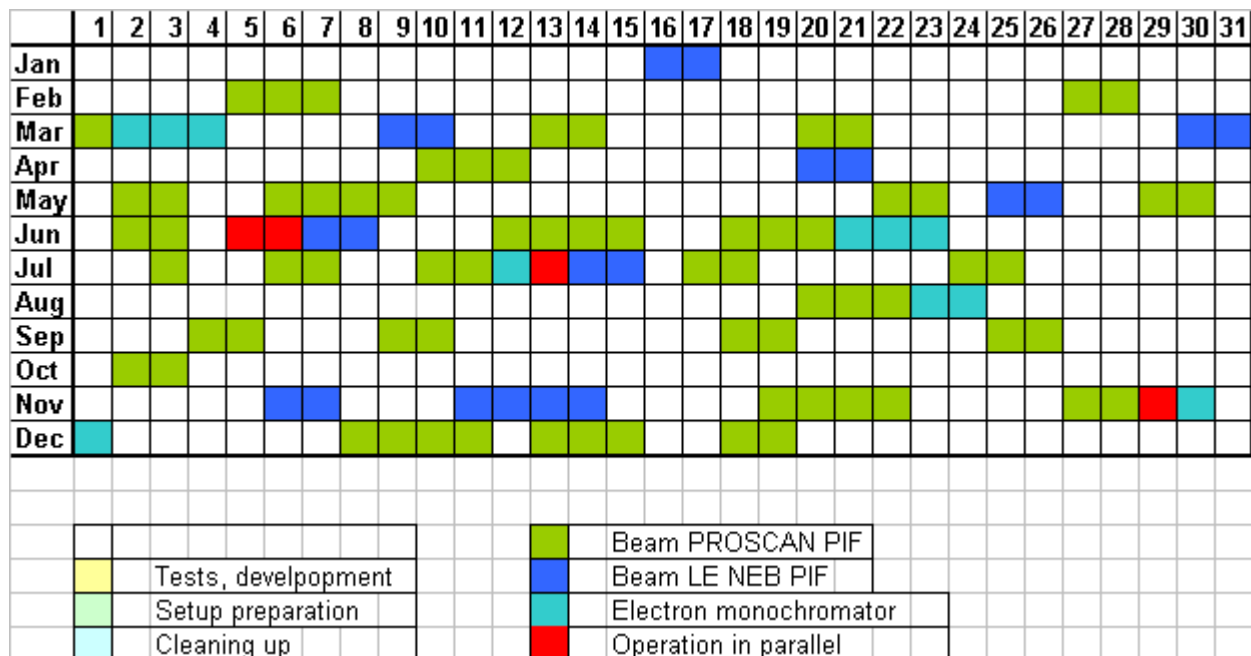


1. Initial proton energies 74, 100, 150, 200, 230, 238 MeV
2. Energy range 6 MeV – 238 MeV quasi continuously
3. Allowed beam currents in test area:
  - 2 nA ( $E > 200$  MeV)
  - 5 nA ( $100 \text{ MeV} < E < 200 \text{ MeV}$ )
  - 10 nA ( $E < 100 \text{ MeV}$ )
4. Fluxes:  $10^2 - 2 \cdot 10^8$  p/cm<sup>2</sup>/s (Gaussian beam, FWHM 10 cm)
5. Profiles: quasi flat (standard 6 cm), focused (FHWM 6 mm) etc.
6. Maximum beam diameter 90 mm
7. XY-table for remote sample positioning
8. Standard ESA DUT frame for 'typical' tests
9. Exposures in air
10. Automated runs
11. User friendly operation

# Control site and test area

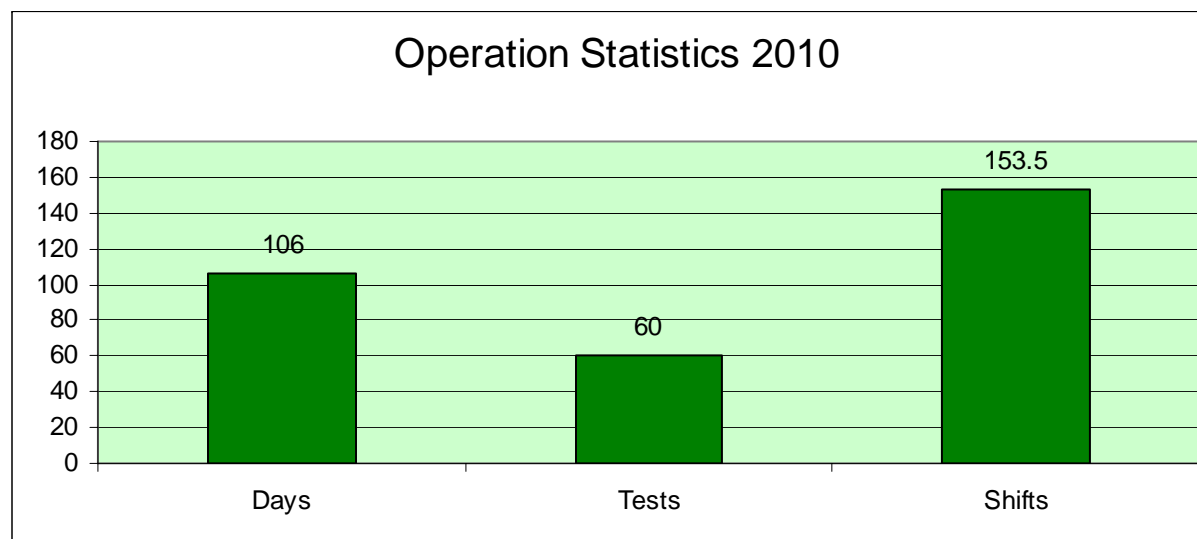


# Beam-time statistics 2010



**Beam hours (flat)** - 1228  
**Days with beam** - 106  
**Shifts** - 154  
**Experiments** - 60  
**Institutions** - 30  
**Countries** - 10

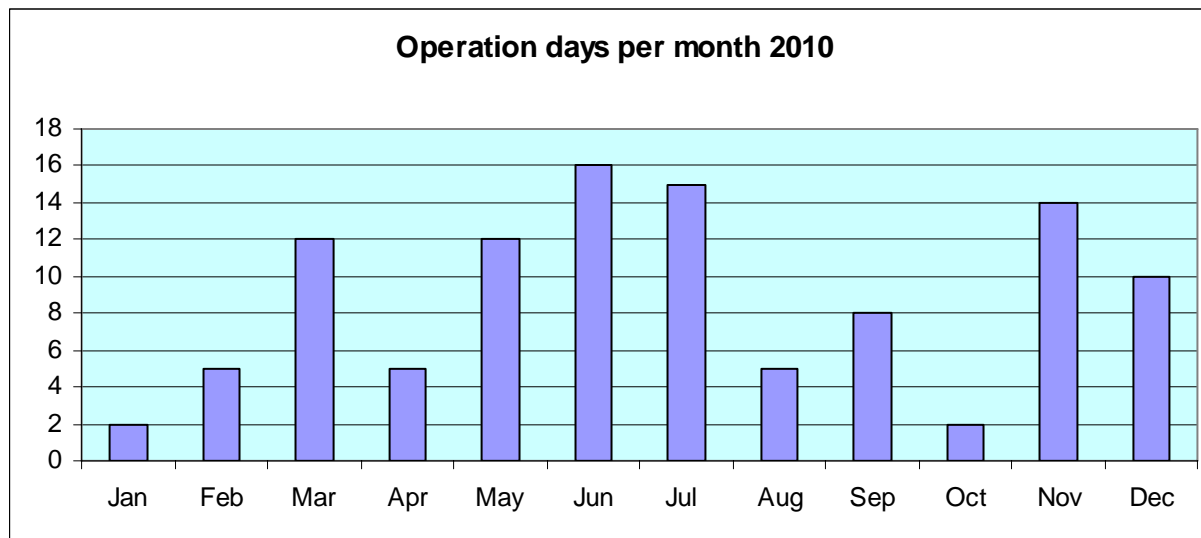
# Operation highlights I.



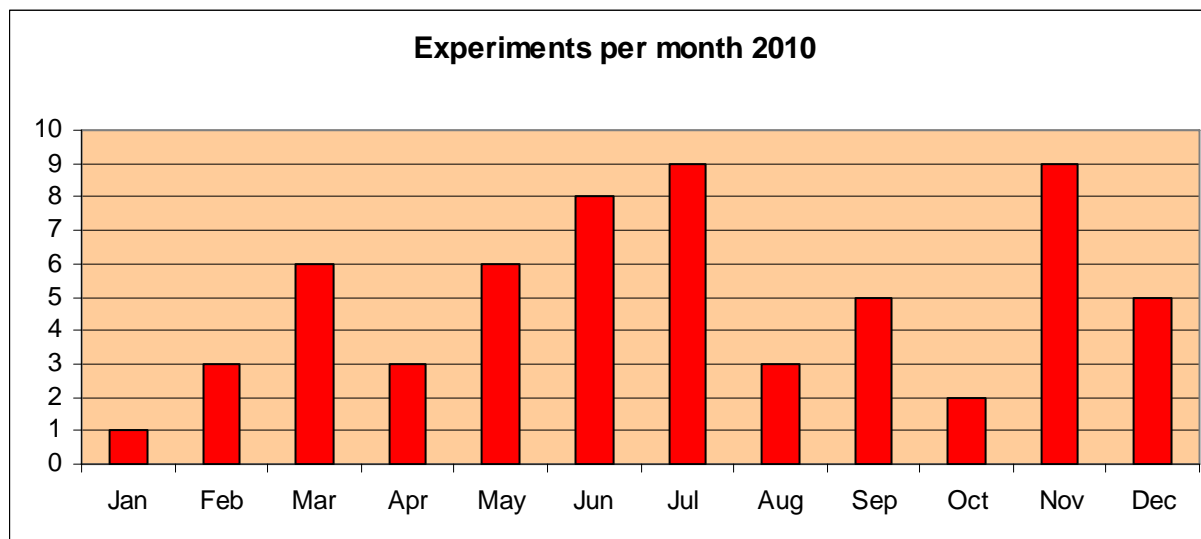
Facility	Shifts	Days
PIF-Proscan	102	73
PIF-NEB	29	23
ELEM	23	14



## Operation highlights II.



Average:  
9 days/month



Average:  
5 tests/month

*Peak months:  
Jun, Jul, Nov*



# Users and experiments I.

No	Project	Devices / Test	Institution	Country
1	Power Devices	Diodes, Rectifiers qualification	ABB	Switzerland
2	Infrared Detectors	Degradation studies in infrared detectors	AIM	Germany
3	DD/TID	Optocouplers, Photosensors	Astrium	Germany
4	LHC	Photodiodes	CERN	Switzerland
5	LHC	Battery Powered Dosimeters	CERN	Switzerland
6	LHC	Humidity sensors	ETHZ, CERN	Switzerland
7	Biomedical Radiometry	Scintillating Position Detectors	CERN, TERA	Italy
8	PROBA2	GPS	DLR, ESA	Netherlands
9	GAIA	CCDs qualification	E2V	England
10	Radiation Monitor	MFS proton calibration	EFACEC	Portugal
11	Radiation Monitor	MFS electron calibration	EFACEC	Portugal
12	Radiation Monitor	MFS proton test for Solar Orbiter	EFACEC	Portugal
13	Radiation Monitor	MFS electron tests for Solar Orbiter	EFACEC	Portugal
14	MEMS	Activation tests of MEMS	EPFL Lausanne	Switzerland

## Users and experiments II.

No	Project	Devices / Test	Institution	Country
15	MEMS	Displacement effects in MEMS	EPFL Lausanne	Switzerland
16	HV-DCDC	Characterization of HV-DCDC for space	EPFL, Space Center	Switzerland
17	Displacement Effets	Optic Fibers	ESA	Netherlands
18	SEE Tests	Clock Drivers	HIREX	France
19	LHC	Power Supply, Function Generator	HIREX, CERN	France
20	Lisa Pathfinder	FM Radiation Monitor calibrations	IEEC	Spain
21	Les Dos Tores LDT	Radiation Monitor test and calibration	INTA	Spain
22	Les Dos Tores LDT	Electronic Components SEE	INTA	Spain
23	TID Tests	Liquid Crystals	INTA	Spain
24	Solar Orbiter	Optical Filters	ORSAY	Francee
25	LEED	DCDC-converter TID	PSI	Switzerland
26	PROPIX	IC+Gotthard ASIC	PSI	Switzerland
27	PROPIX	IC, pixels scan	PSI	Switzerland
28	PROPIX	Cross talks and gain tests	PSI	Switzerland

## Users and experiments III.

No	Project	Devices / Test	Institution	Country
29	TID Tests	Optical Filters and Fibers	QinetiQ	England
30	ISS Program	Validation of rad-hardness for ISS parts	QinetiQ Belgium	Belgium
31	Displacement Tests	Laser and Optical Fibres	RUAG	Switzerland
32	Radiation Monitor Galileo	EMU Calibration Tests	RUAG, QinetiQ	England
33	APD, MTG	Tests of degradation in novel electronics	SELEX Galileo	Italy
34	TID Tests	GaAs technologies	SELEX Galileo	Italy
35	Degradation studies	CCD characterisation	SSEL	England
36	Bepi Colombo	CCD characterisation	University of Bern	Switzerland
37	TID Tests	Liquid Crystals	University of Liege, INTA	Belgium
38	Particle Detector	Energetic Particle Telescope EPT electron calibrationTests	University of Luvain	Belgium
39	Particle Detector	Energetic Particle Telescope EPT proton calibration	University of Luvain	Belgium
40	BELA Laser Systems	Displacement Damage of Epotech H72	ZEISS	Germany
41	Bepi Colombo	Optical Filters	ZEISS	Germany

Before starting test users should register at <http://duo.psi.ch> .

The obligatory dosimetry class can be absolved remotely during registration. It will entitle you for batch/dosimeter.

As Switzerland is outside EU the customs procedure apply. Please contact in advance Severine Stalder +41 56 310 2913.

Be aware that some part will get activated and must stay at PSI until radiation level drops. Prepare needed documents.

As many users apply for beam time early registration of test exposure at <http://pif.web.psi.ch> is welcomed.



## Operation after shutdown of the Injector 1

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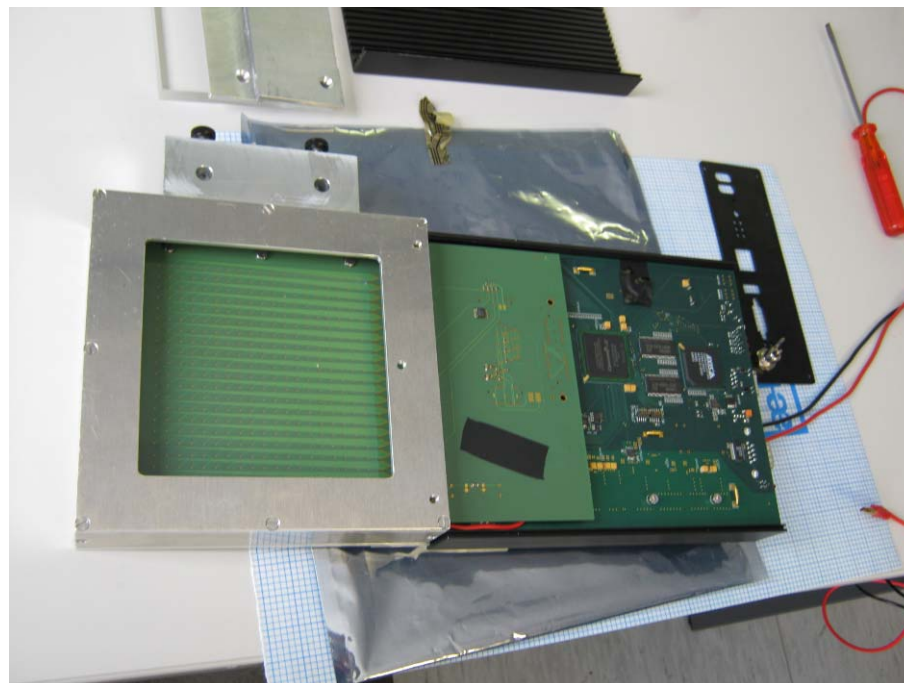
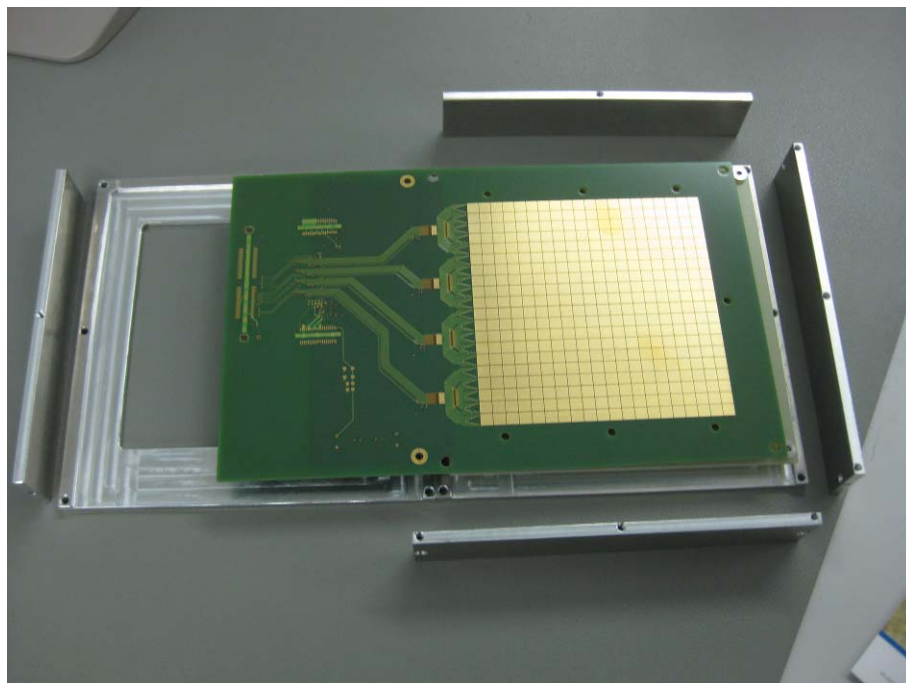
The low energy facility NEB is closed due to the shutdown of the Injector 1 accelerator.

The NEB beams were characterized by larger flat fields and high fluxes (above  $10^9$  /cm<sup>2</sup>/s).

As the PROSCAN accelerator also provides beam with energy of 74 MeV (close to Injector 1) the functionality of low energy facility is preserved.

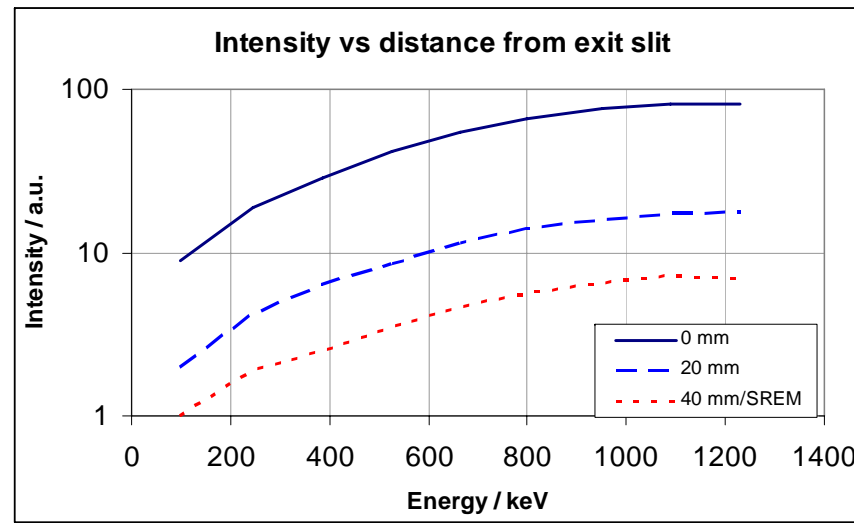
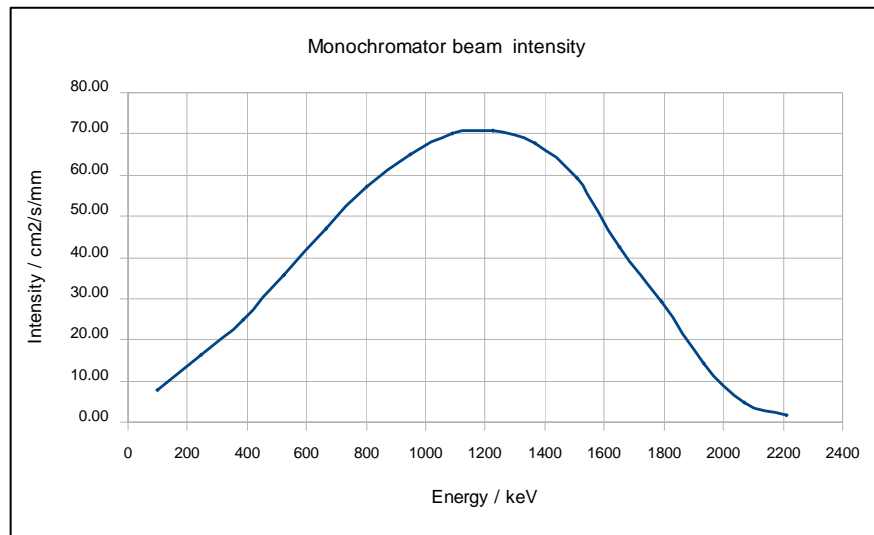
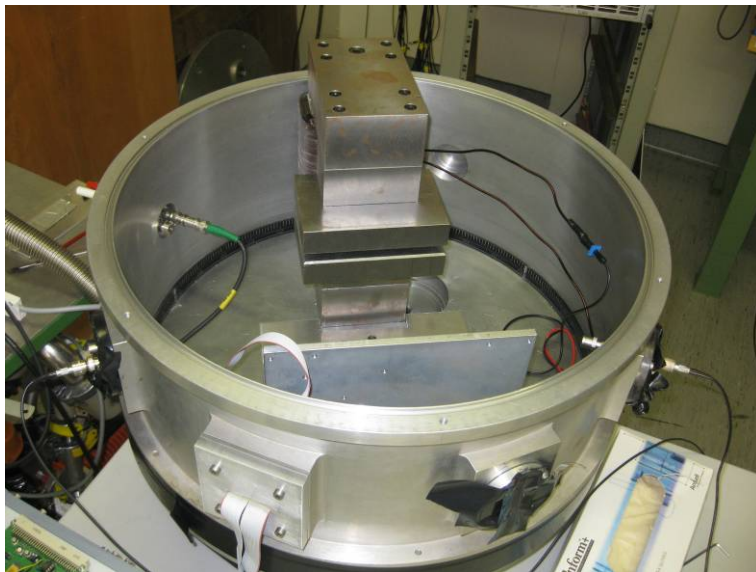
Operation with energies of 74 MeV and below is offered during weekends – standard mode for PIF at PROSCAN

## Improvements in dosimetry



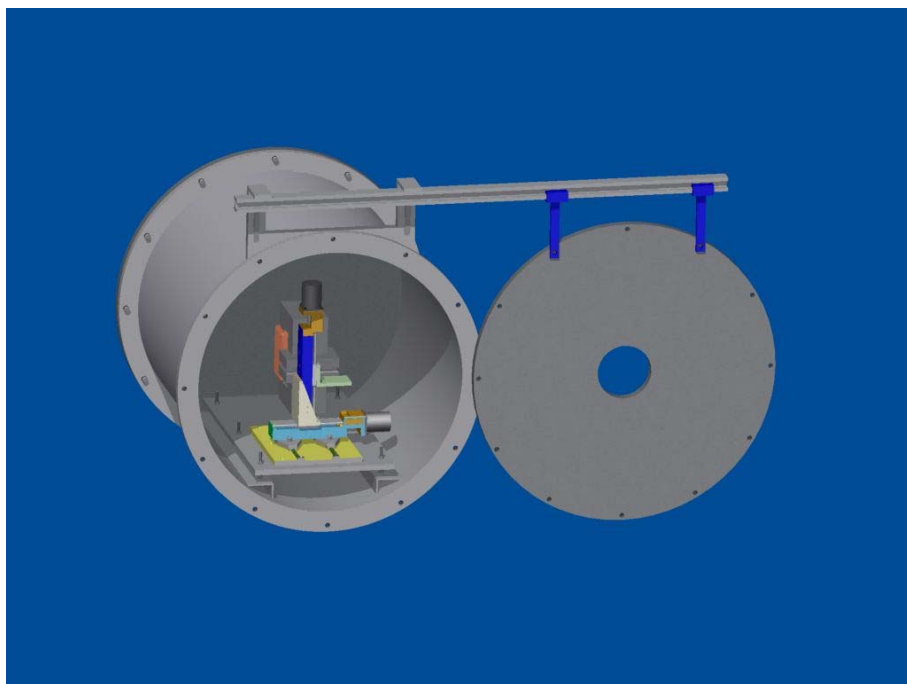
New beam profile monitor for protons and HI  
Pixelised ionization chamber – 400 channels  
Coupling to current integration ASICs  
Sensitivity < 5000 e-  
Controlled via ethernet

# Electron monochromator



## New electron monochromator

New ELEM is under construction  
Operational in September 2011  
The equipment will consist of:  
XY-table, powerful pumping system  
stronger or more energetic sources  
Old monochromator is still available





Users have access to wide infrastructure needed for tests and commonly available during exposures.

There is a number of scopes, power supplies, soldering tools, cables , hubs, PCs, screens as well as mechanical tools.

In case an assistance of institute services (workshop, electronics etc.) is needed the users are to be present early in advance.

PIF facility at PSI provided in 2010 more than 1200 hours of particle beams

Three facilities (NEB, PROSCAN and ELEM) served during 106 days for about 60 experiments

PROSCAN cyclotron operated in stable and user friendly manner. All tests at NEB are taken over by the facility coupled to this accelerator

The electron monochromator will be upgraded with bigger chamber, XY-table and more intense and energetic sources

PSI users should be aware of early booking and of formalities with customs and samples resending after activation drop



Thank You

