



AIDA Final Meeting
9-11 Dec. 2014
CERN

The New Gamma Irradiation Facility at CERN




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(on behalf of the PH GIF team)



PH-DT
Detector Technologies




Overview


-  Introduction
-  Update of construction
-  Practical information

GIF⁺⁺ - A Joint Project




-  EN-Department (EN-MEF) provides the infrastructure for housing the irradiator and detectors : Civil engineering components, beam line elements, control room and the supply of general infrastructure (electricity, gas, gas distribution lines inside the facility...)










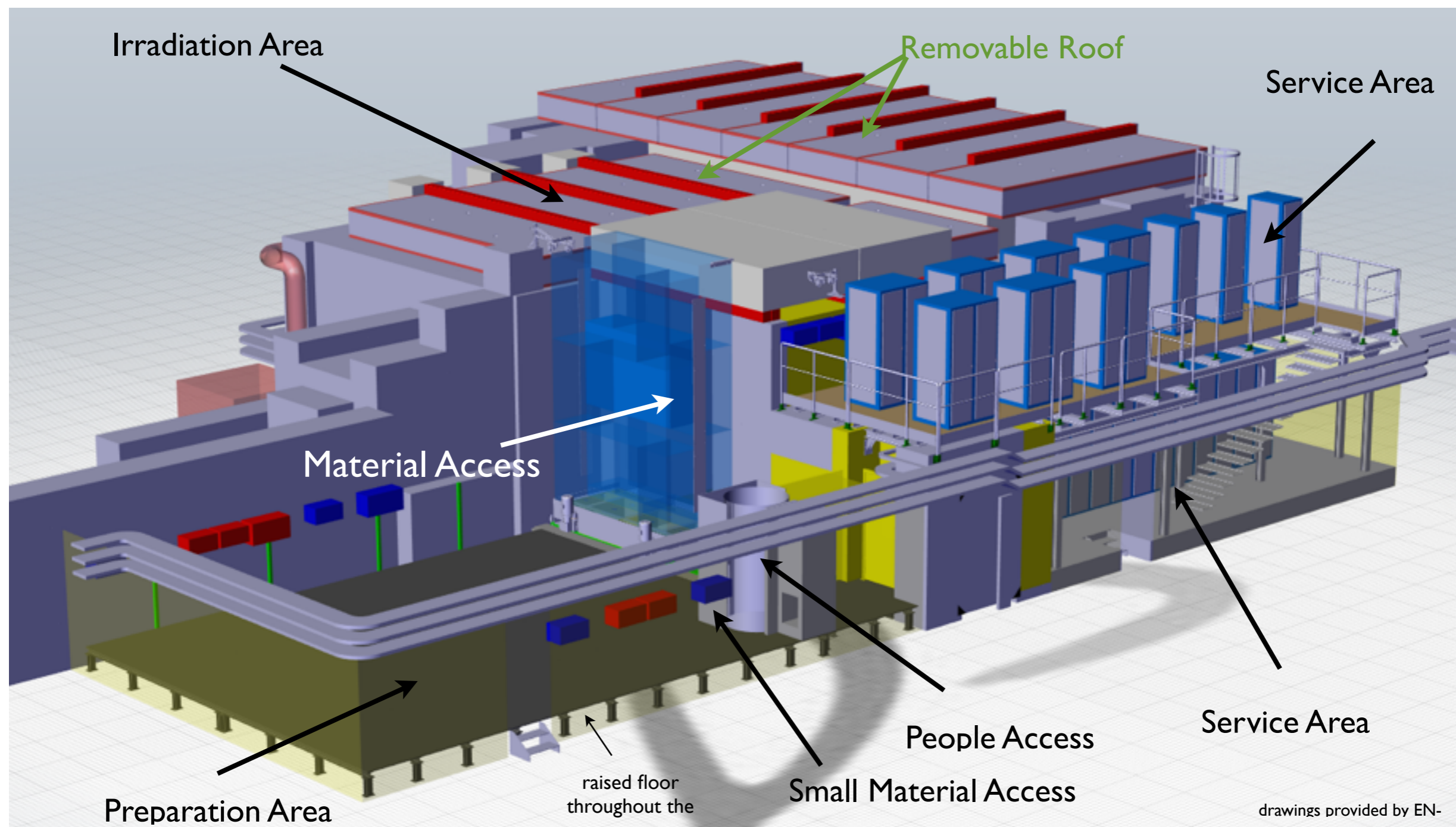
-  The CERN PH-department (PH-DT) provides the irradiator & attenuator, the facility controls (GIF control System), the gas systems, as well as the user management.



-  The user community providing the detector specific infrastructures within the framework of the FP7 AIDA project.

The GIF⁺⁺ Facility

-  GIF⁺⁺ is a unique place, located at the EHN1 hall at CERN, where high energy charged particle beams (mainly muon beam) are combined with a **14 TBq ¹³⁷Cesium source**
-  The 100 m² irradiation bunker has two irradiation zones making it possible to test real size detectors, of up to several m², as well as a broad range of smaller prototype detectors and electronic components
-  2 wide irradiation field ($\pm 37^\circ$) with independent attenuators up to 50.000 (Pb, Fe). Angular correction filter for both fields (exchangeable)
-  High energy Muon beam from T2 target, on H4 beam line
(few weeks dedicated muon beam & around 30% of the beam time halo muon beam)
-  Fixed installed beam-trigger & cosmic-trigger
-  Central Control System : record of environmental parameters, beam parameters, filter settings, gas,... provides interlocks (e.g. for wrong gas mixtures)
-  Wide range of available gases (+ custom gases),



3rd Annual Meeting of AIDA : **The GIF++ facility**

<https://indico.cern.ch/event/282487/session/1/contribution/237>

TIPP 2014 / Proceedings of Science :

CERN GIF++ : A new irradiation facility to test large-area particle detectors for the high-luminosity LHC program.

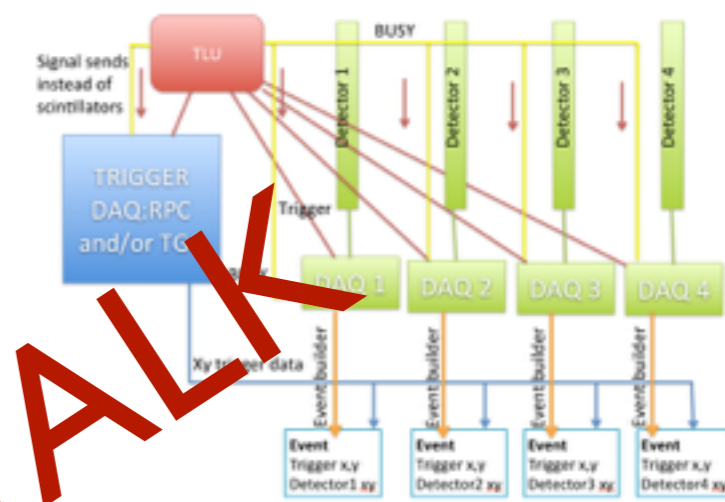
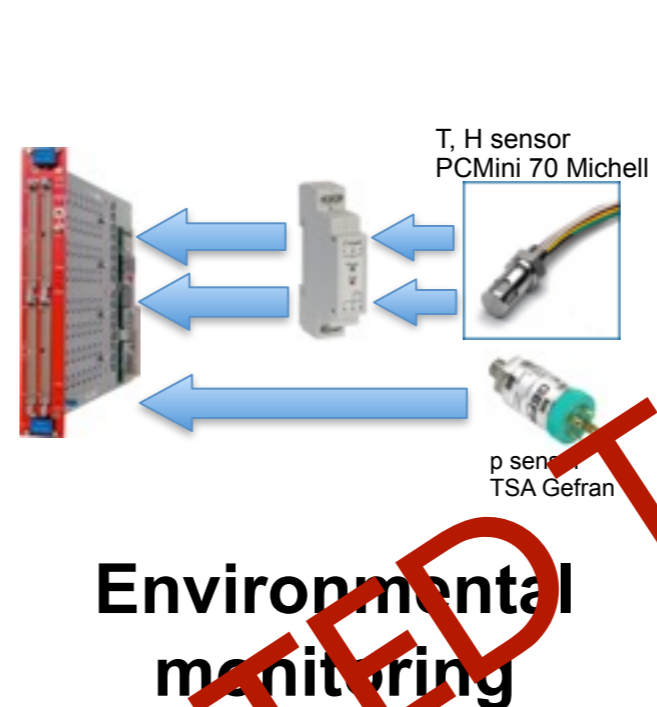
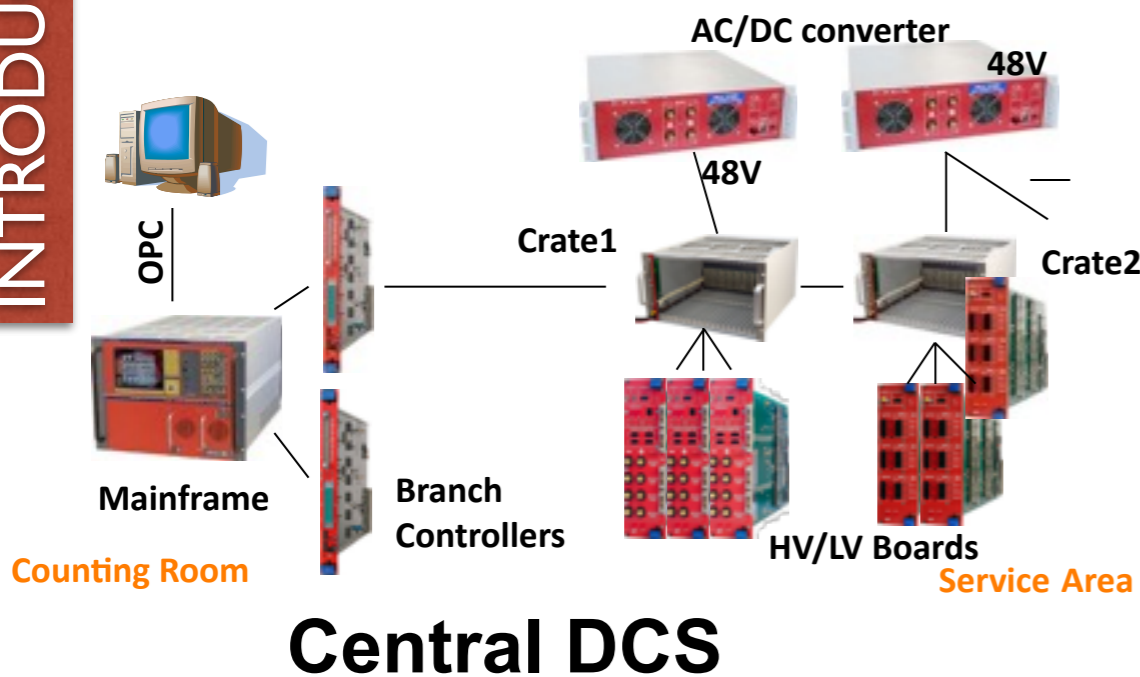
http://http://pos.sissa.it/archive/conferences/213/102/TIPP2014_102.pdf



AIDA

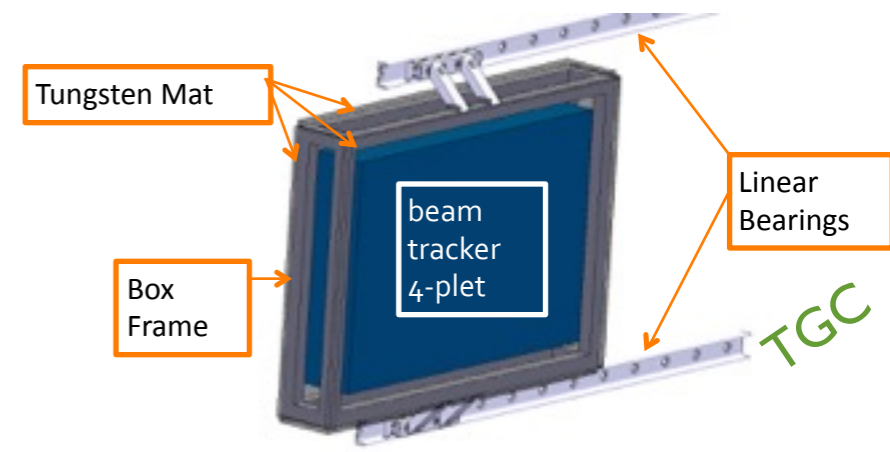
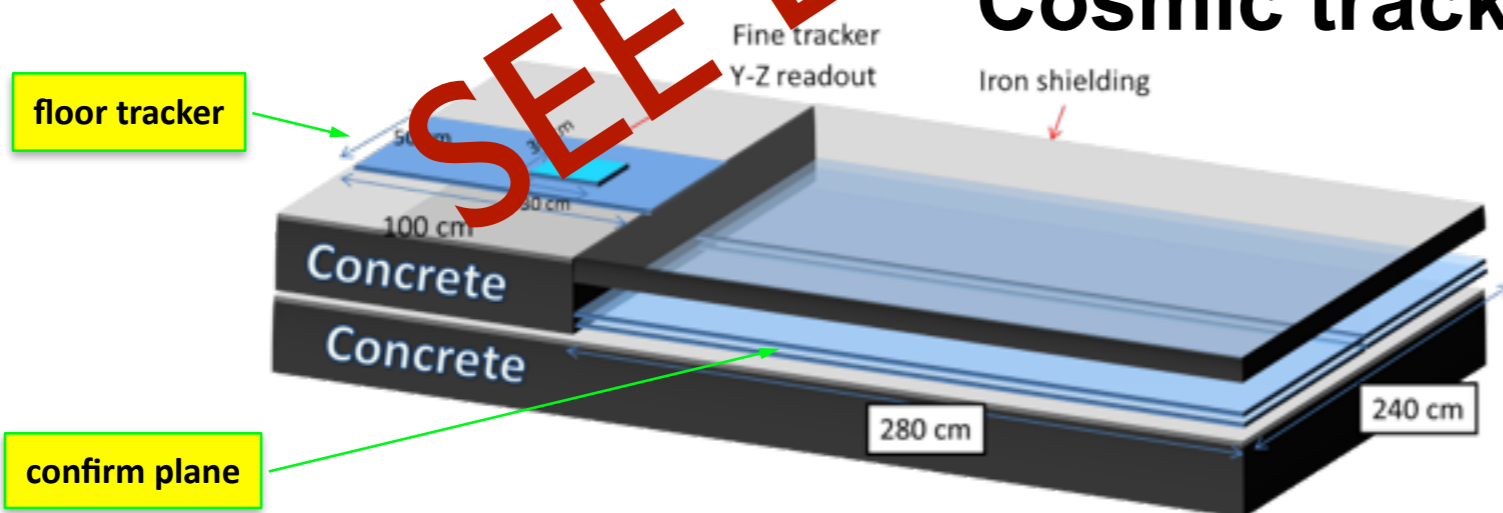
User Infrastructure

INTRODUCTION

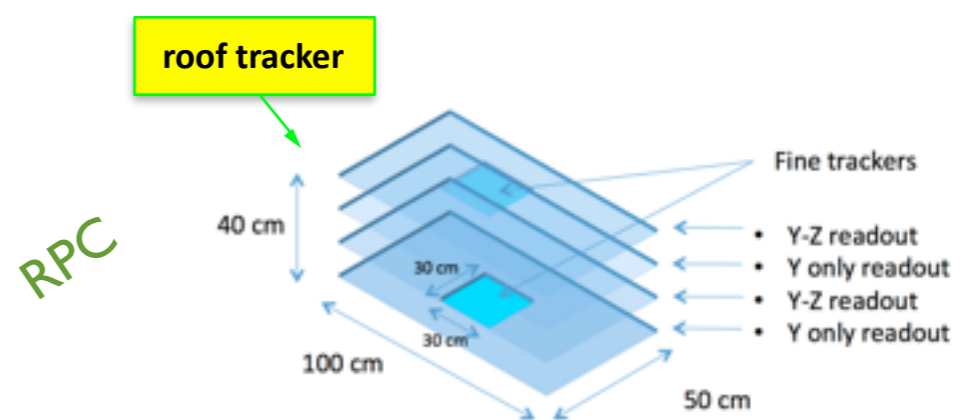


8 RADMON sensors

Cosmic tracker



Beam tracker



SEE DEDICATED TALK

The Gamma Source

1.Nov.2011 = 14.91 TBq
260 μ Gy/s at 1 meter

Attenuator

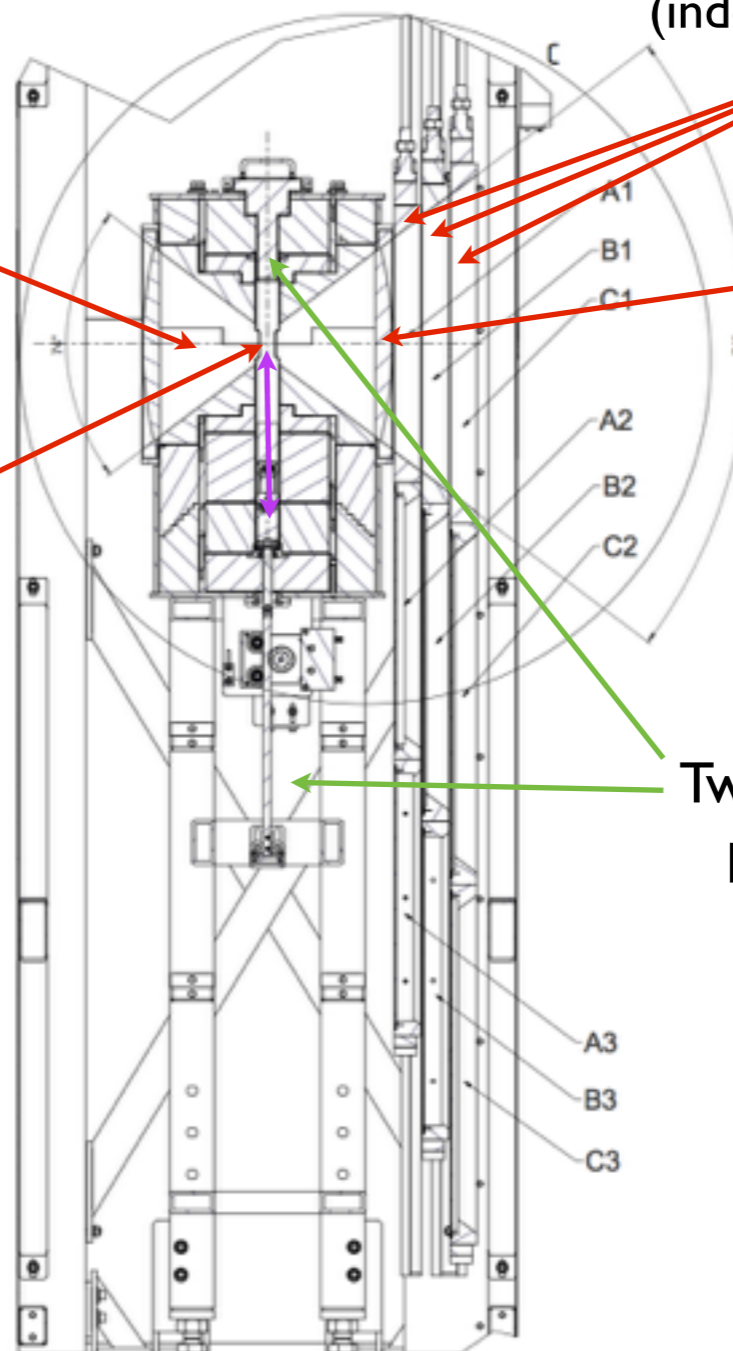
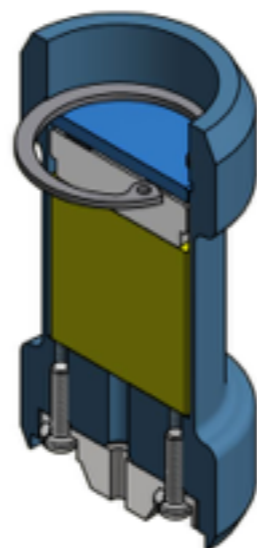
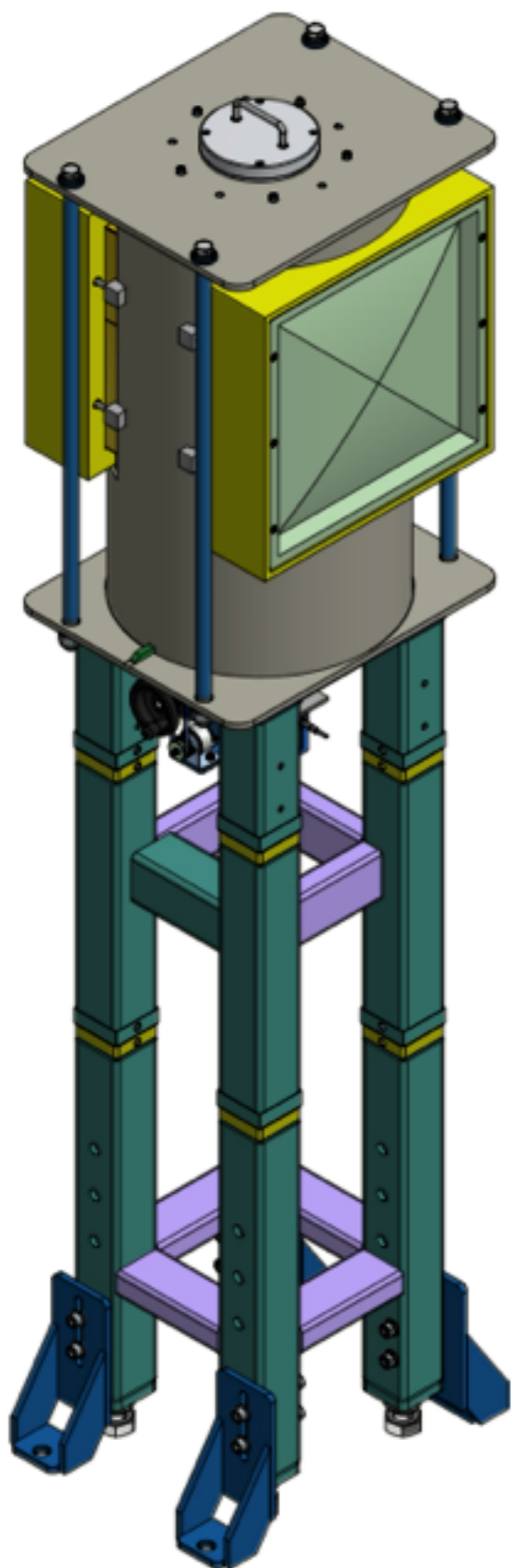
3 planes of Pb (Fe) plates
flexible, up to 50.000
(independent on both sides !)

Second field

(same characteristics as primary)

Angular
correction filter

Two rods showing the
position of source



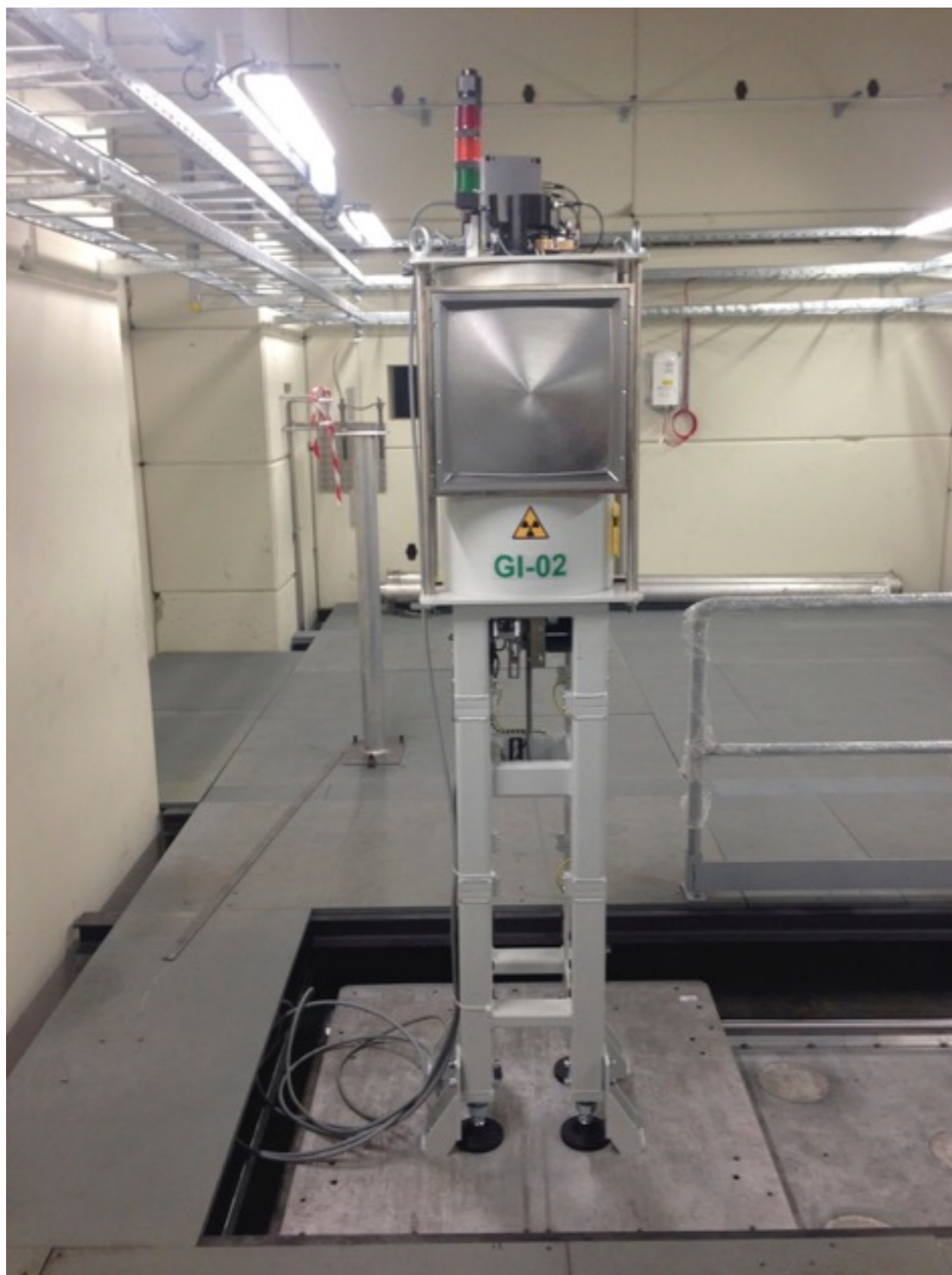
14 TBq Cs¹³⁷

Source available in Prague Hot-Cell, certificate received.



Source stacked with
two cylinders of ⁷⁴W
while in Irradiator

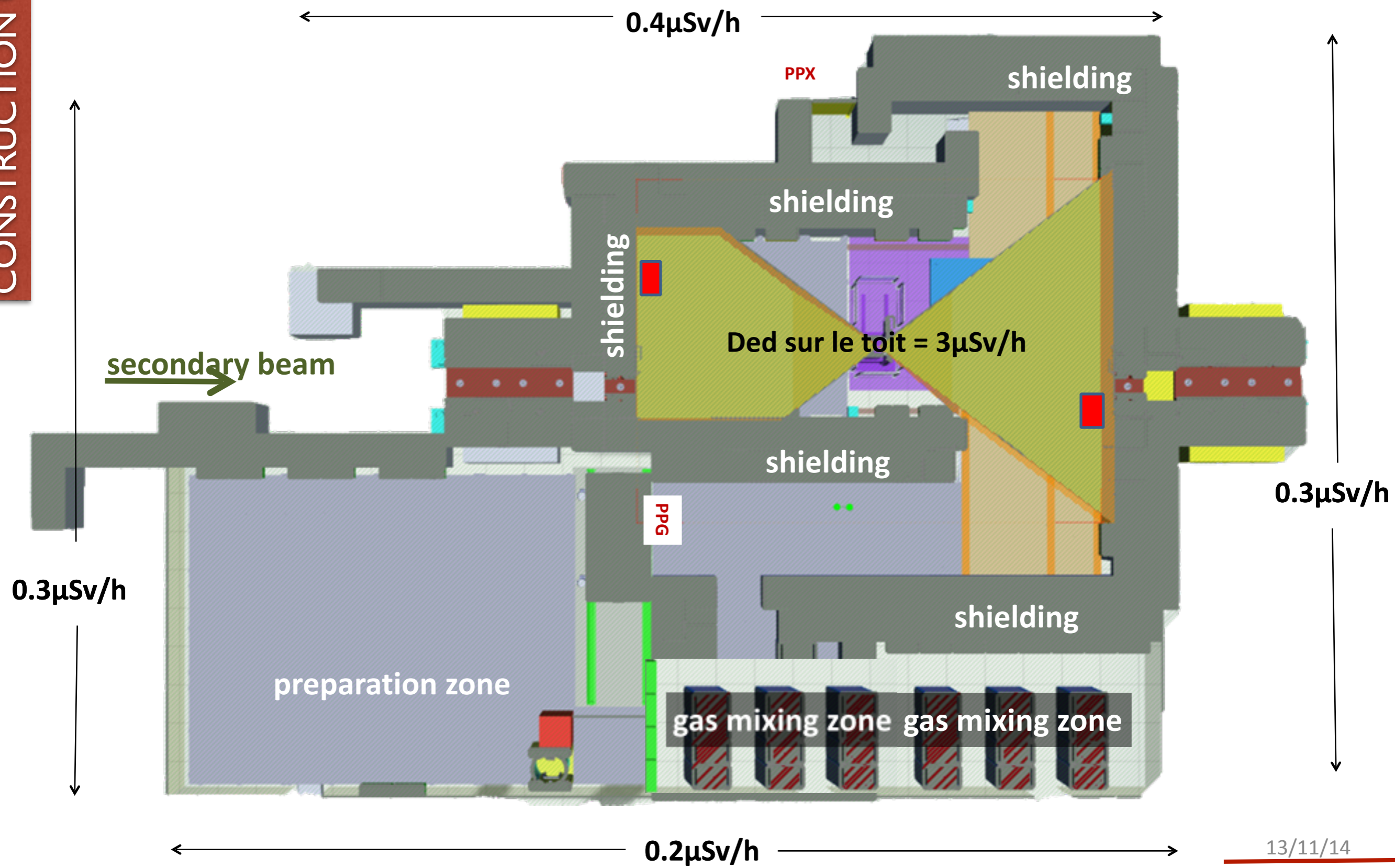
The Gamma Source



- 🔧 Installed 12-14. Nov.'14 ✓
- 🔧 Integrated into EHNI - H4 access system ✓
- 🔧 Beam Permit signed on 25.Nov.'14 ✓
- 🔧 Cs Source available for radiation ✓
- 🔧 **First Users : Early 2015**

CONSTRUCTION UPDATE

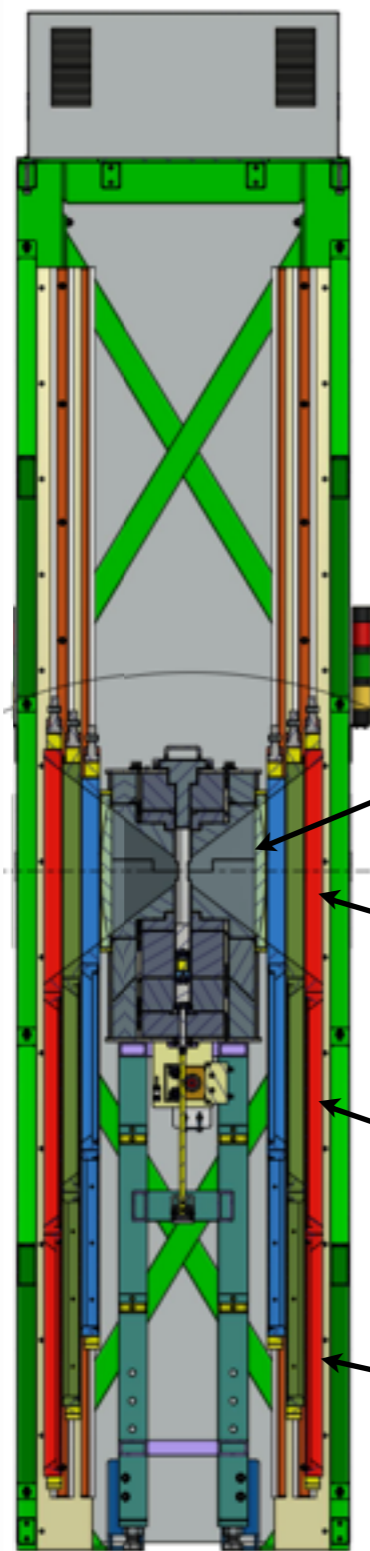
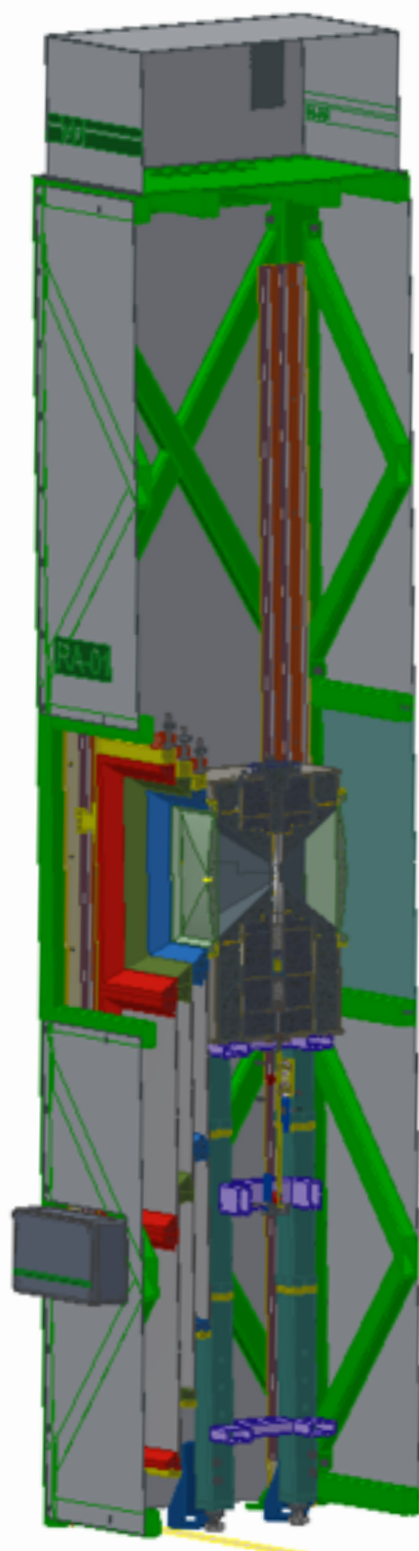
GIF RP survey



The Attenuator System

Two identical attenuation systems each consisting of one angular correction filter (Fe) and 6 absorption filters - a total of 14 custom shaped filters

Angular correction filter provides uniform photon distribution for large area detectors

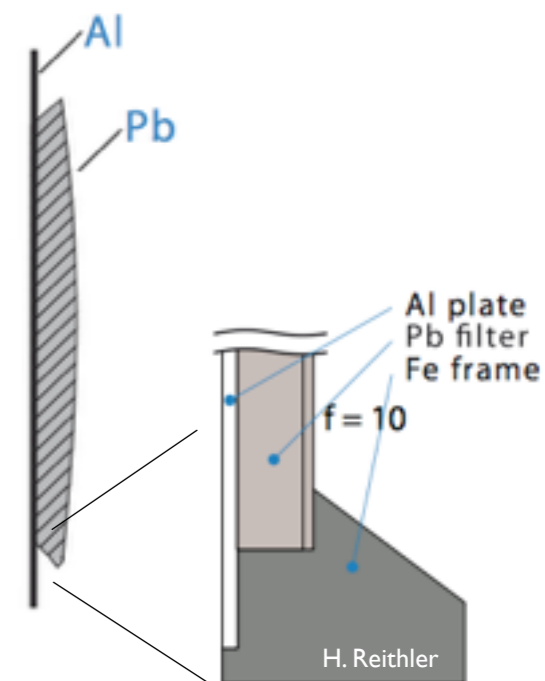


ABC





Filter System :

A	B	C
Absorption factor		
0	0	0
10	1.47	2.15
100	100	4.64

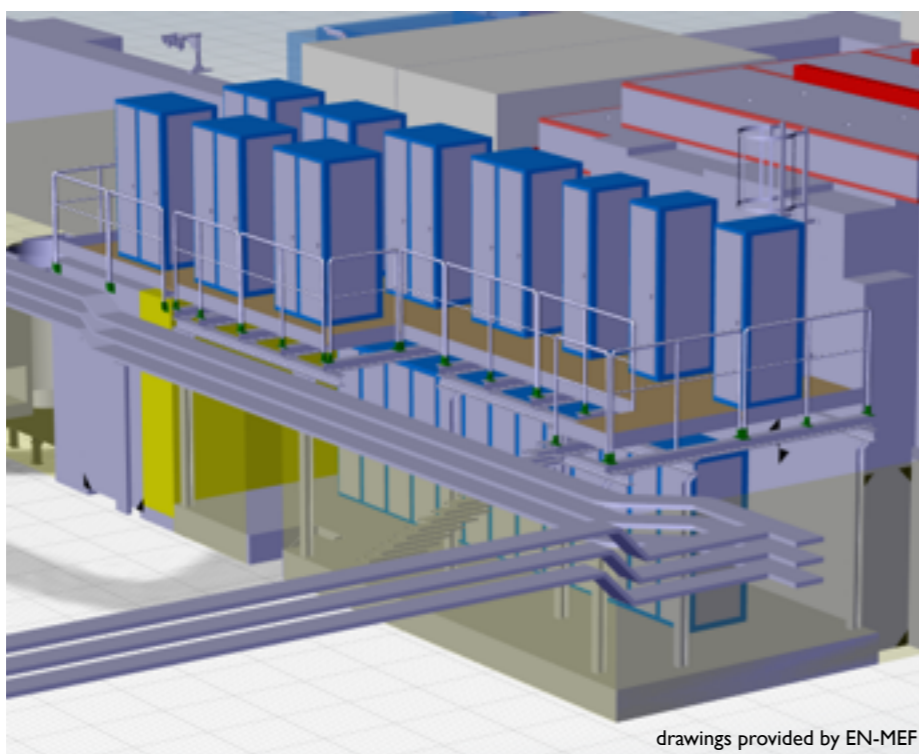



The Attenuator System


-  Installation finishing TODAY (9.12)
-  Acceptance test 10.12 (tomorrow)
-  Operational from Console
-  Remote control will come with installation of GIF control system

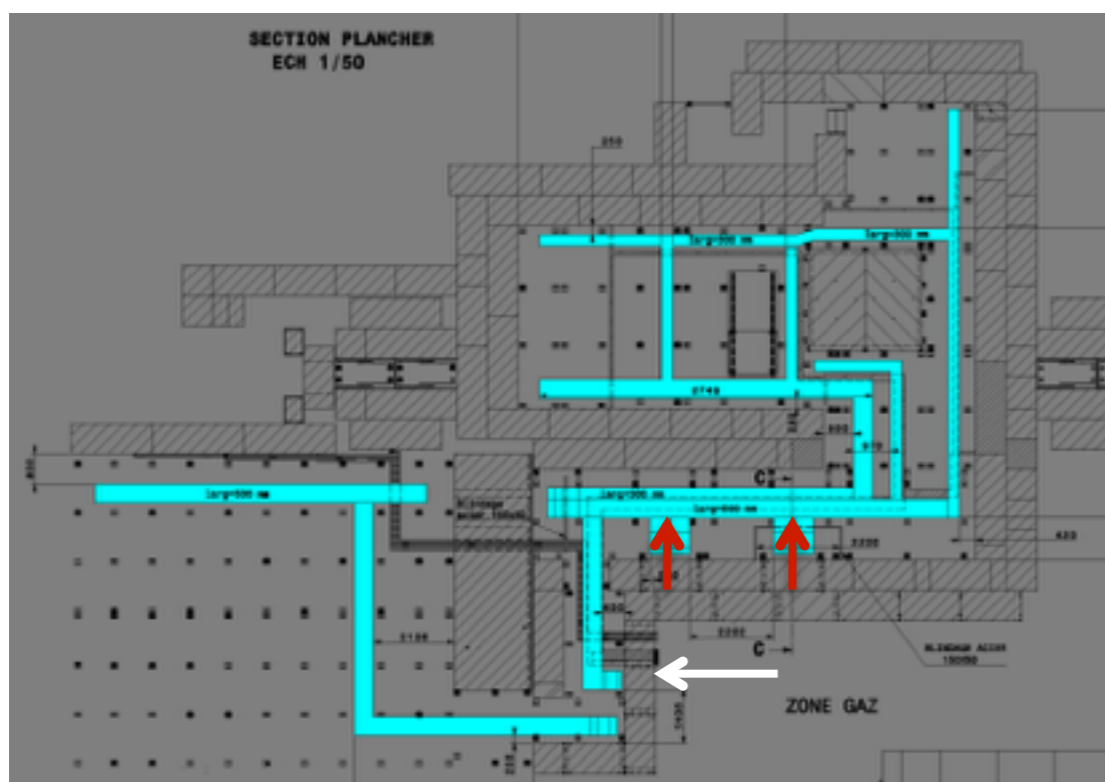





Service Area



- 
 Ground floor : Irradiator controls, DCS, electronic racks
 Racks available, power and network available within a few days.
 Cabling and rack assignment has started.

- 
 Top floor : 17 gas racks and distribution panels. 40 m² net area
 Supply panels installed. False floor finished. Gas rack installation will start now.



- 
 Cable trays under false floor
- 
 Short path $\geq 13\text{m}$
- 
 Normal path $\approx 25\text{ m}$

Mixture distributions

- Gas distribution panels:
 - Distribution panel: 6 supply + 6 return lines each
 - Simple panels (one link only): 16
 - Complex panels (link bunker and preparation): 4
- All panels installed
 - Leak test completed for half
 - Leak test remaining panels will be completed before Xmas

- Primary gases:
 - Installed by EN-MEF



Gas mixers: beam & cosmic triggers

- Gas mixing rack for beam and cosmic triggers:
 - Two mixers ready
 - Installation will start end of this week.
 - Commissioning early January



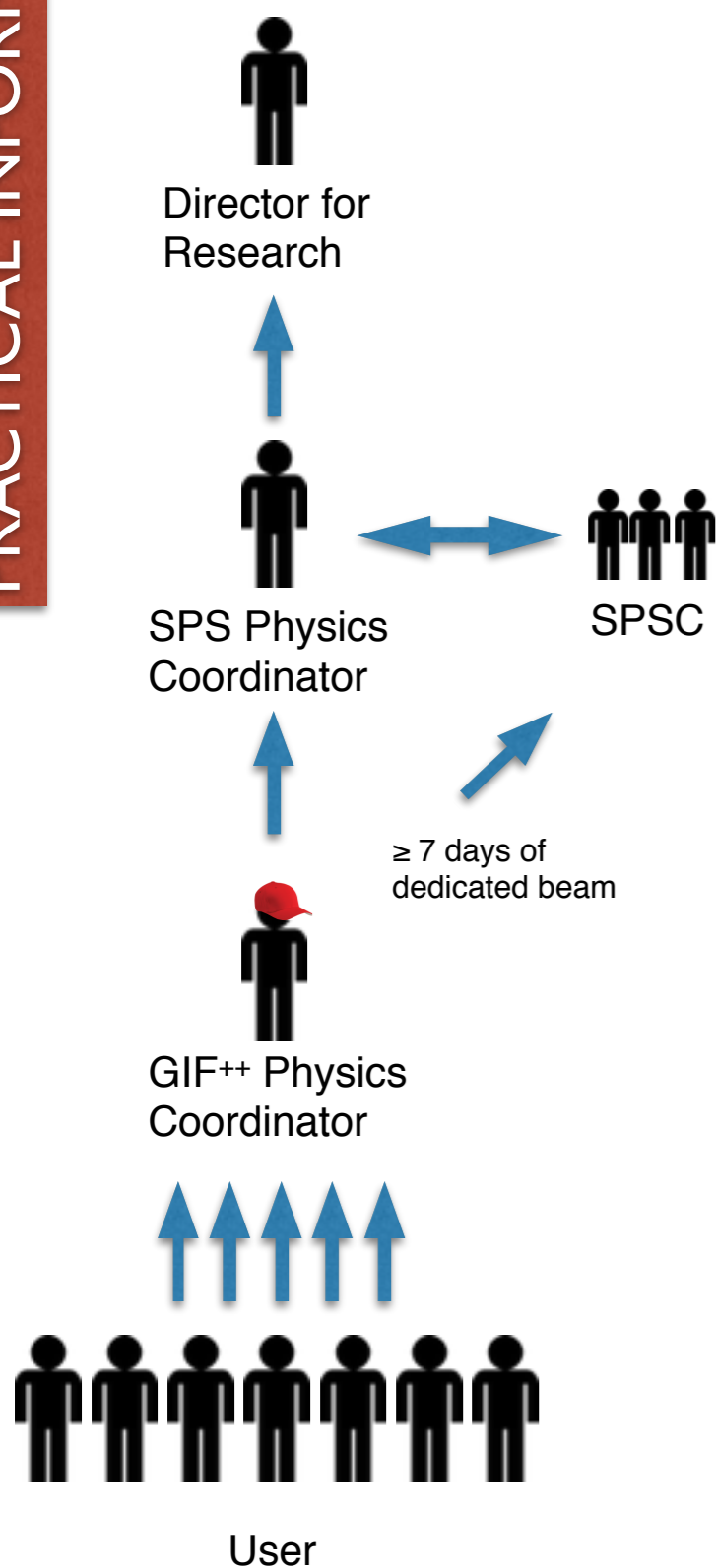
Gas analysis and recirculation

- Gas analysis:
 - O₂ + H₂O analysis and IR racks ready for installation
- Gas recirculation:
 - Ready for installation
- Installation and commissioning:
 - Completed by mid-January



Beam Time Request - SPS

(Simplified)



Responsible : SPS Physics Coordinator



Delegates GIF area requests to :



GIFPhysics.Coordinator@cern.ch



GIF Physics Coordinator collects all requests

[Modes : beam (6-8 weeks) / parasitic beam (30-50%) / cosmic (all year)]



Submits an optimised bundle request to SPS Coordinator, who then defines periods dedicated to different GIF modes. Based on received H4 requests



GIF Ph.C. has authority to optimise user schedule for all modes, within the constraints of the SPS schedule



Together with user community












GIF Ph. C represents GIF in weekly PS/SPS meeting. Main user (especially during beam) is encouraged to join !




Calls for beam time are send out by SPS Ph.C. / notification & reminder send by GIF Ph.C
 Beam time requests for more than 7 days have to be endorsed by the SPSC



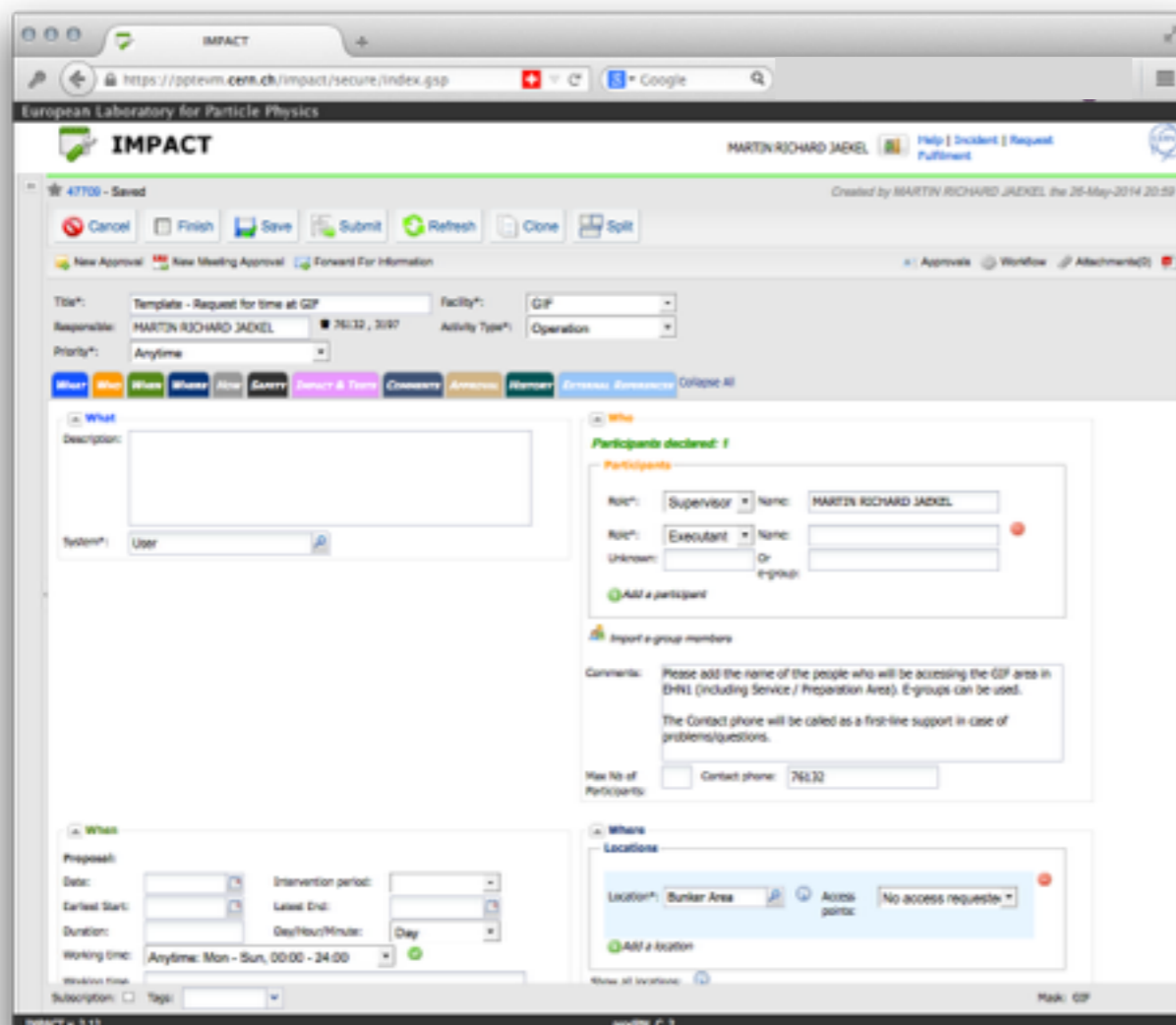
GIF-PH.TechCoord@cern.ch

-  Space management inside the bunker & preparation zone
-  Supervises & helps with user installation
 -  installation of cables & electronics
 -  rack space distribution
 -  gas requests
-  Collects all requests for infrastructure enhancements
-  Helps with daily problems
-  Contact to EN
-  Based at CERN (PH-DT)



-  Group Leader in Matter of Safety
 -  One GLIMOS for all PH irradiation facilities
 -  + one Deputy for GIF++

GIF Irradiation Request



- 💡 GIF Facility created in IMPACT
- 💡 Used for ALL irradiation request
- 💡 Template : [Activity 47709](#)
- 💡 Beam requests need approval from SPS Physics Coordinator
- 💡 Allows time and space management
- 💡 Describes the experiment and frequency of planned access
- 💡 Lists requirements and boundary conditions (operation mode, time period)
- 💡 List of gas requirement & budget code (if applicable)
- 💡 Lists preferred dose rate / absorption factor
- 💡 Defines access to bunker area
- 💡 Link to all safety & procedure documents

Requirements for Access



HNA486/487




GIF Bunker / H4 - 154

 EHN1 : Dosimeter (standard CERN privileges)

 EDH : “Control Room HNA-487 (0887-1-R87)”

Stored on access card, needs to be activated in dedicated card station, EHN1 coffee barack.

 EDH : "GIF++ Zone Turnstile (EHN1-GIF)"

 Valid and approved IMPACT request (activated soon)

Users' meeting and beginning of operation

- Several request for beam time and irradiation time received
- **Next Users' meeting : 14/1/2015** (to be confirmed).
- Important to participate for:
 - Space allocation in the bunker, electronic and gas service zones
 - Collect requirements for gas systems
 - Collect requirements for final operation (how many users, which gas, pressure).
Info needed to define the final gas detection system (flammable and ODH risk)
 - Collect additional requirements (e.g. cooling)