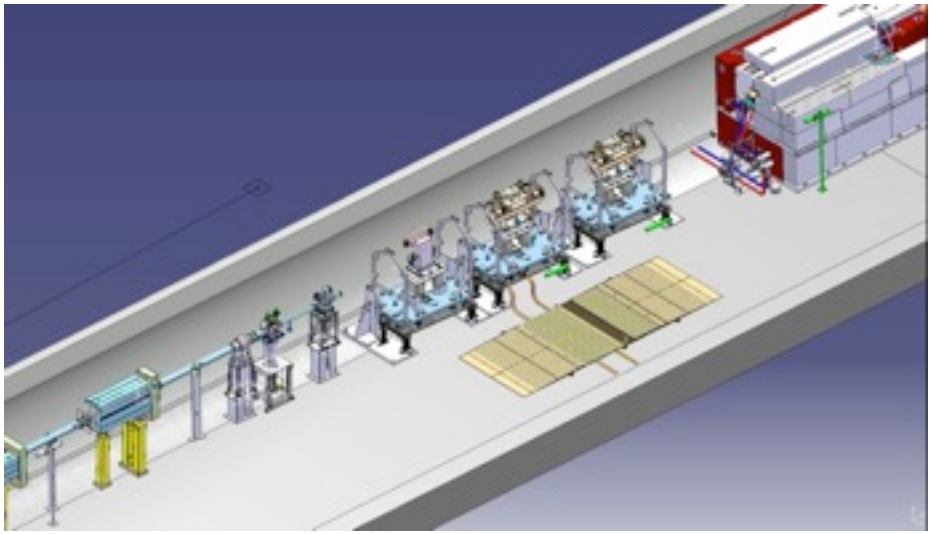
HiRadMat
High-Radiation to Materials

EuCARD

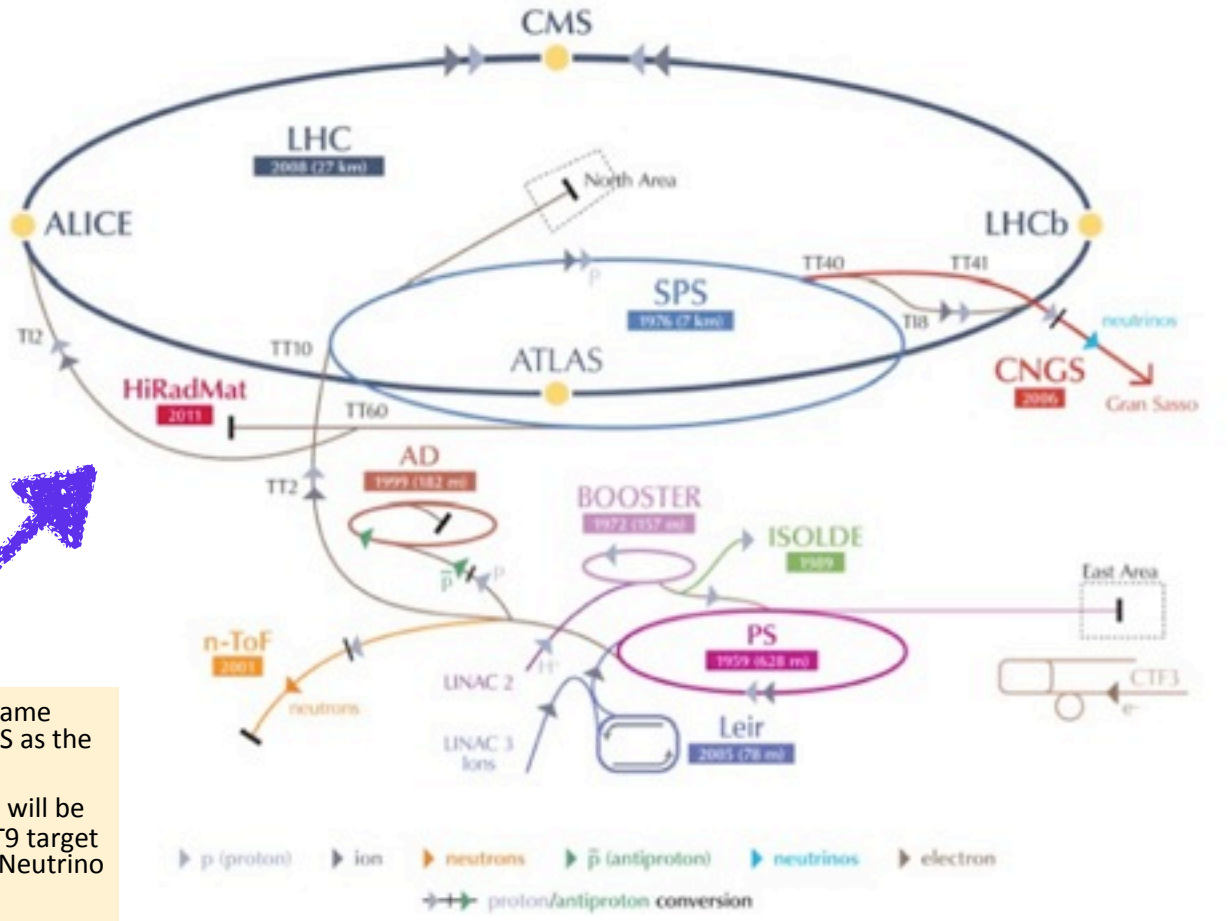
WP5 : HiRadMat@SPS - Status Report



Ilias Efthymiopoulos, CERN

3rd Annual Meeting - Warsaw, April 27, 2012

Location

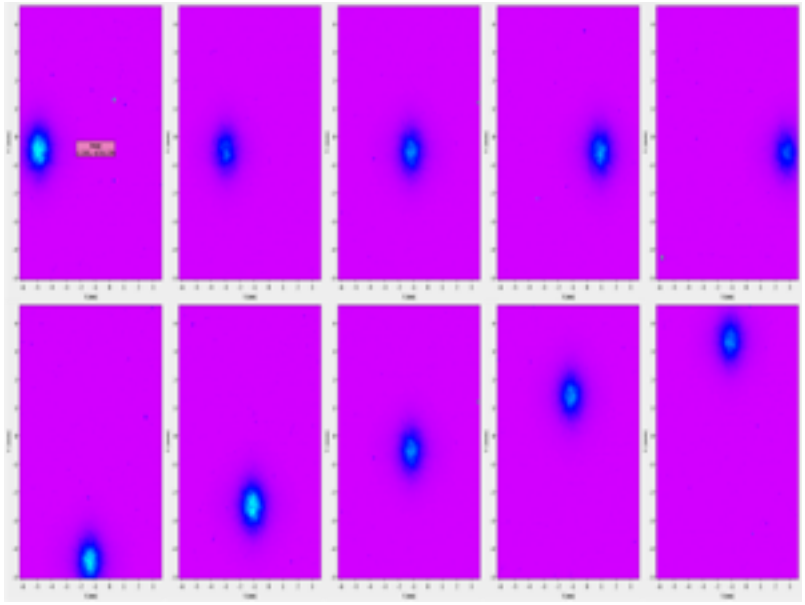


HiRadMat shares the same extraction from SPS as the **TI2** line to LHC

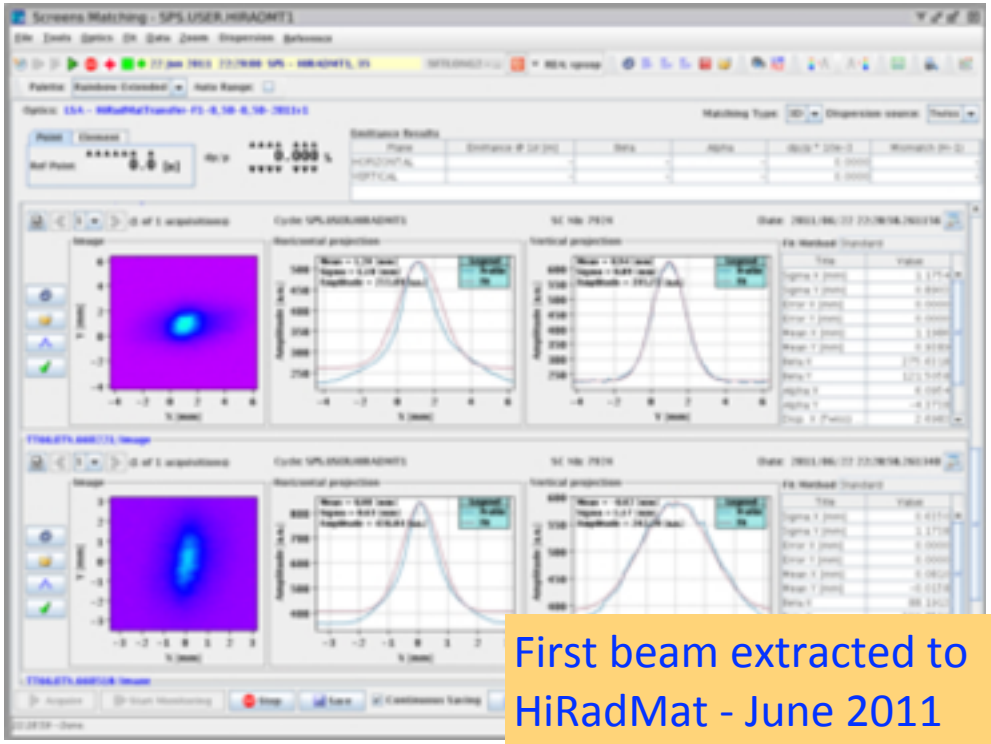
The experimental area will be upstream the old T9 target for the West Area Neutrino Facility - **WANF**

WP5 - Status Report

- Installation completed in 2011
- Beam commissioning completed !
  - Low intensity beams - June 2011
  - High intensity beams - Sept 2011

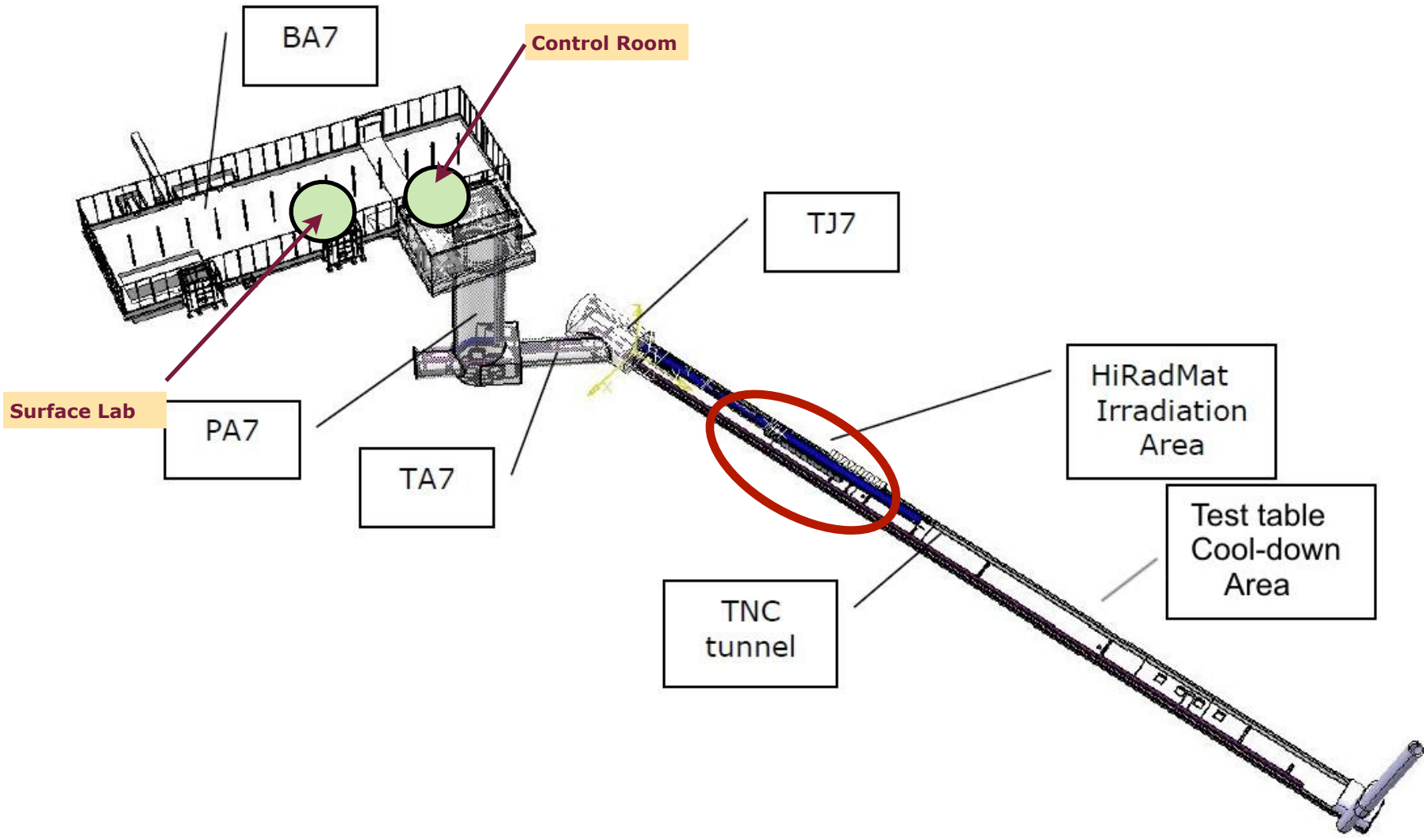


Beam steering on target



First beam extracted to HiRadMat - June 2011

Surface & Underground Areas



Experimental Area

- Recuperate the old WANF (TNC) tunnel

Experimental Area

- New HiRadMat Experimental Area

Experimental Area Layout

3 irradiation stands for experiments

Experimental Area Layout

Experimental Area

- Remote operations

- optimized design for fast cable installation/removal

Safety file

- The safety file for the facility is completed
- Presented and got the approval for the operation of the facility
  - CERN RP and Host States officials

HiRadMat
High-Radiation to Materials

EDMS No. 1145706 | Rev. 2.1 | Validity In Work

Reference: HiRadMat Project – 2010-03

CERN
CH-1211 Geneva 23, Switzerland

Date: 02/09/11

Safety documentation

HiRadMat safety file

Inventory document

Abstract

This inventory document is a compendium giving reference to the other documents which constitute the HiRadMat safety file. It is made of 4 tables:

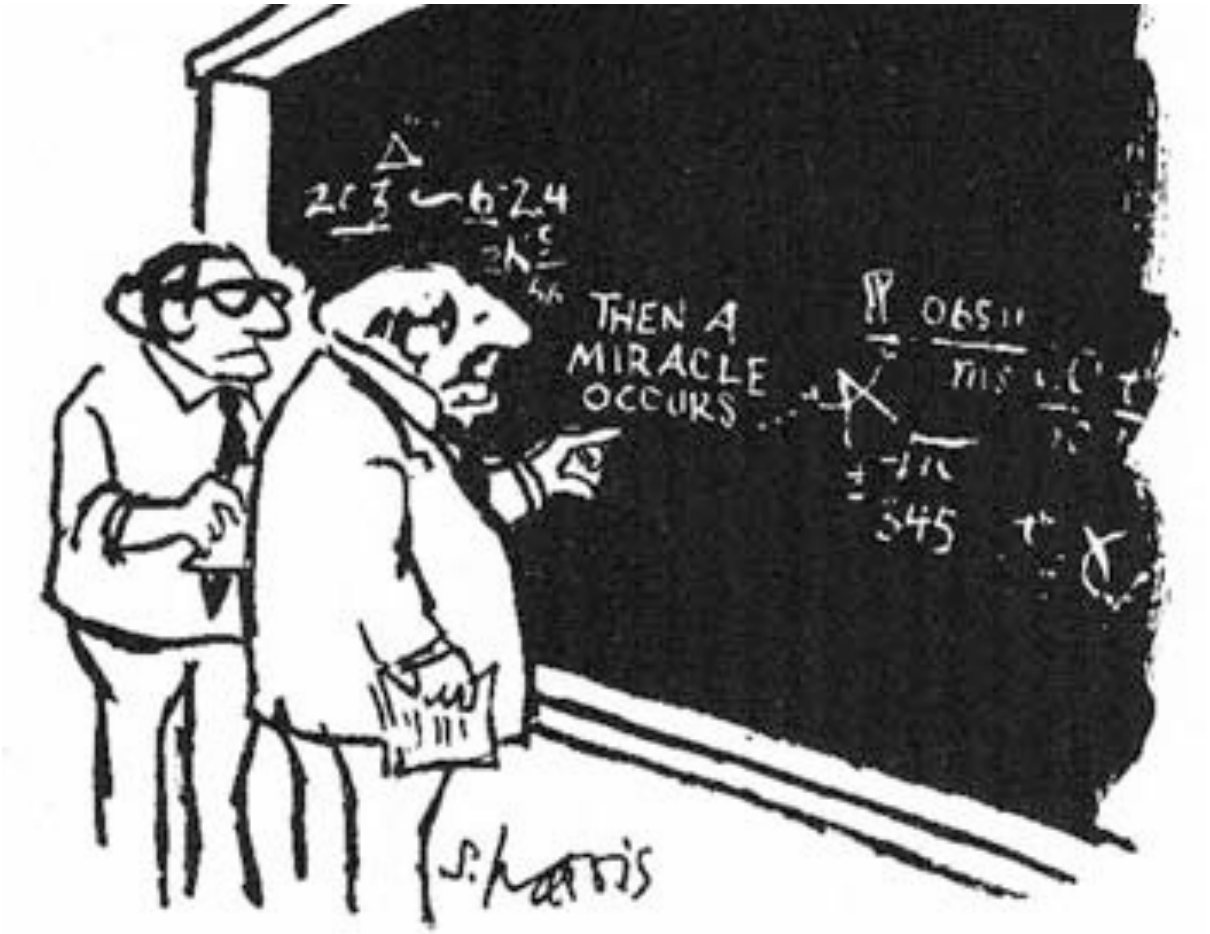
- *Table 1 summarizing the descriptive documents*
- *Table 2 summarizing the demonstrative documents*
- *Table 3 summarizing the operational documents*
- *Table 4 summarizing the feedback documents*

By definition, this document is not exhaustive, will evolve in the course of the project and will be updated frequently.

Prepared by :	To be Checked by :	To be Approved by :
S. EVRARD (EN-MEF) M. PICARD (EM-MEF)	HiRadMat review experts	I. Efthymiopoulos (EN-MEF)

WP5 - Status Report

- ...now preparing for the first experiments and TAs !!



"I think you should be more explicit here in step two."

HiRadMat Project

Management Structure - Operations

A & T Sector Mgmt

HiRadMat Facility Project
Project Leader : ***I. Efthymiopoulos***
Deputy PL : ***S. Evrard***

IEFC Committee

Operation

Experiments

Commissioning Coordination
M. Meddahi

HiRadMat Scientific Board
- I. Efthymiopoulos - CERN (secretary)
- S. Evrard - CERN
- Y. Kadi - CERN
- B. Riemer - SNS
- **N. Simos - BNL (chair)**
- S. Sgobba - CERN
- M. Wohlmuther - PSI

HiRadMat Technical Board
- K. Cornelis - SPS Beam
- S. Gilardoni - PS beam
- **I. Efthymiopoulos - HiRadMat (chair)**
- S. Evrard - HiRadMat (secretary)
- M. Meddahi - SPS/HiRadMat beam
- A. Pardons - HiRadMat
- J. Pedersen - EN DSO
- M. Tavlet - BE DSO
- C. Theis - RP

- **Physicist in charge :** I. Efthymiopoulos
- **Engineer in charge :** S. Evrard
- **Beam Operation & Monitoring :** K.Cornelis, V.Kain, CCC(SPS)
- **Area Manager :** D.DePaoli
- **User support team:**
  - **engineering :** A. Pardons
  - **tech. support :** M. Lazzaroni, MEF

HiRadMat Project

Management Structure - Operations

A & T Sector Mgmt

HiRadMat Facility Project
Project Leader : ***I. Efthymiopoulos***
Deputy PL : ***S. Evrard***

IEFC Committee

Operation

Experiments

Commissioning Coordination
M. Meddahi

HiRadMat Scientific Board
- I. Efthymiopoulos - CERN (secretary)
- S. Evrard - CERN
- Y. Kadi - CERN
- B. Riemer - SNS
- **N. Simos - BNL (chair)**
- S. Sgobba - CERN
- M. Wohlmuther - PSI

HiRadMat@SPS TA
User Selection Panel

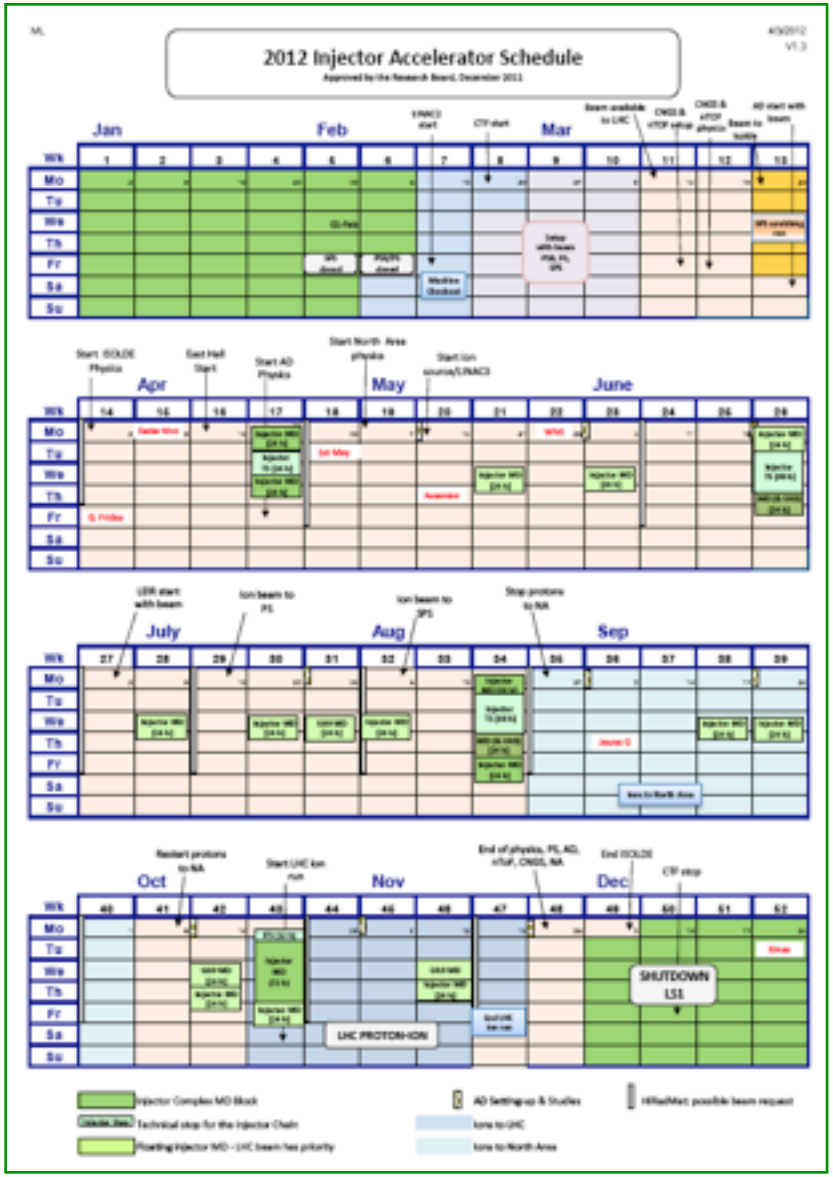
- Physicist in charge : I. Efthymiopoulos
- Engineer in charge : S. Evrard
- Beam Operation & Monitoring : K.Cornelis, V.Kain, CCC(SPS)
- Area Manager : D.DePaoli
- User support team:
  - engineering : A. Pardons
  - tech. support : M. Lazzaroni, MEF

echnical Board
- K. Cornelis - SPS Beam
- S. Gilardoni - PS beam
- **I. Efthymiopoulos - HiRadMat (chair)**
- S. Evrard - HiRadMat (secretary)
- M. Meddahi - SPS/HiRadMat beam
- A. Pardons - HiRadMat
- J. Pedersen - EN DSO
- M. Tavlet - BE DSO
- C. Theis - RP

Experiment Schedule - 2012

- HiRadMat Operation visible in the injector (SPS) schedule for 2012

- **Ten** 1-week beam slots allocated in the SPS schedule
  - placed around the technical stops to facilitate exchange of experiments
  - 8 experiments scheduled for 2012
    - 5 will use TA funds



HiRadMat
High-Radiation to Materials

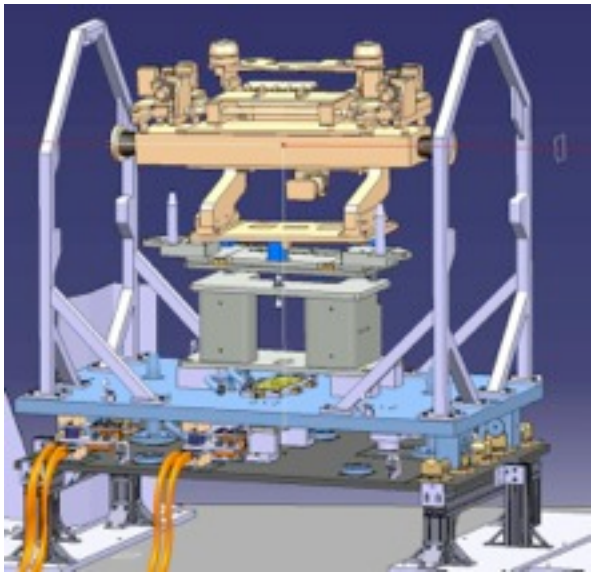
Experiment Schedule - 2012

Week	Dates	Exp-No	Exp-ID	Title	Contact	TAs
w21	21-25/05	HRMT10	NTHIMBLE	Validation of granular target for high beam power applications	C. Densham (RAL)	20 (RAL)
w24 w27	11-15/06 02-06/07	HRMT12	LPROT	HEDM damage experiments	R. Schmidt (CERN)	10 (GSI, UAM)
w29	16-20/07	HRMT15	RPINST	RP instrumentation test	M. Silari (CERN)	5 (INFN)
w32	06-10/08	HRMT09	LCOL	LHC collimator test	S. Redaelli (CERN)	
w35	27-31/08					
w40	01-05/10	HRMT06	TPSG4	TPSG4 validation	J. Borburgh (CERN)	
w44	29/10-02/11	HRMT14	LCMAT	New LHC Collimator materials	A. Bertarelli (CERN)	5 (INFN)
w47	19-23/11	HRMT09	SLACRC1	SLAC Rot. Collimator test	T. Markiewicz (SLAC)	
		HRMT01	TISD	Tests of advances SiC and Al2O3 as model for RIB production	T. Stora (CERN)	5 (FR, BE)
						45

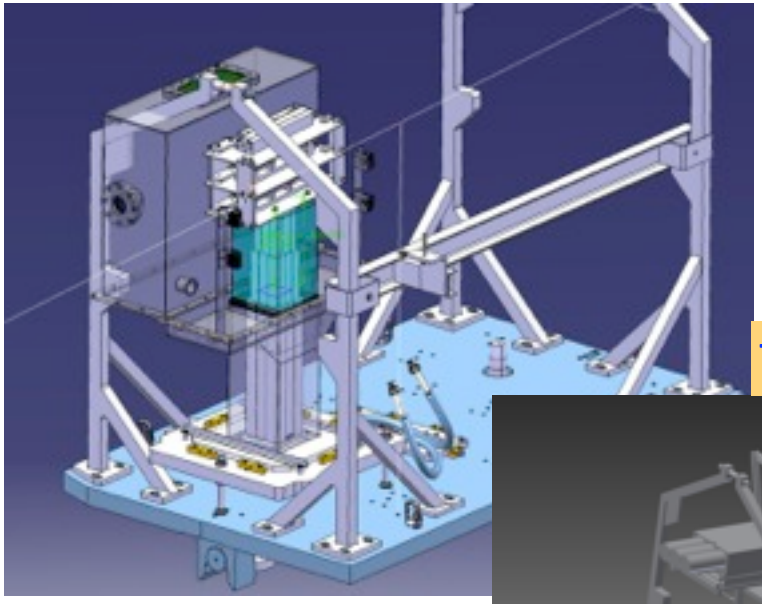
- HRMT10 - would also give a EUCARD Thesis (N.Charitonidis - EPFL)

Experimental Area

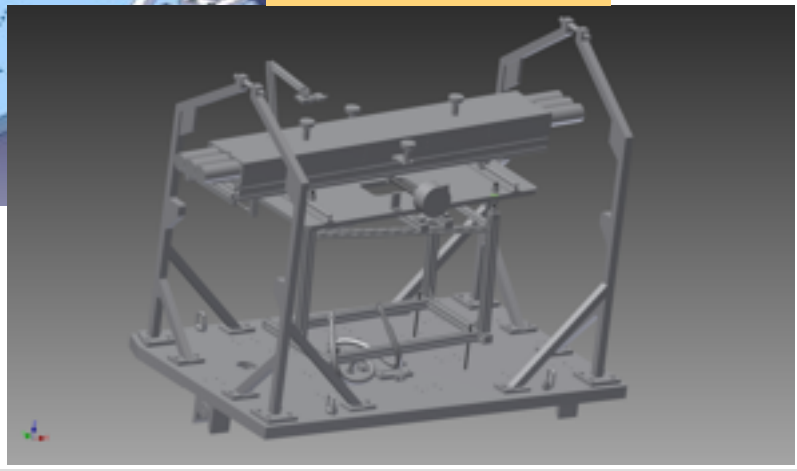
Test of collimators



Test of target samples

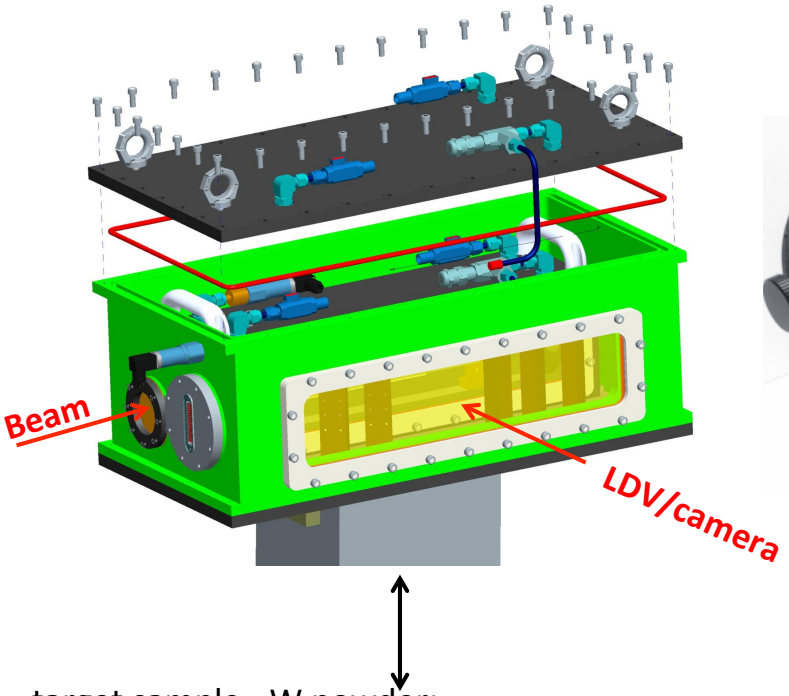


Test of materials



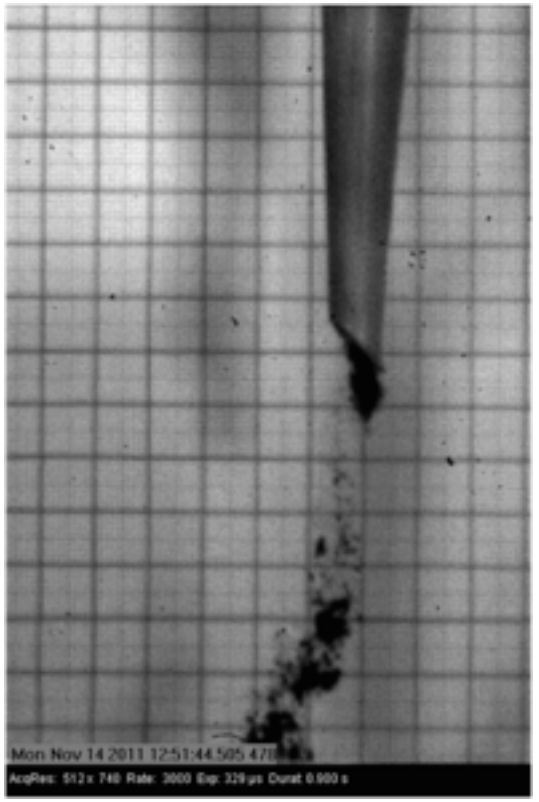
Experiment Highlights

- HRMT10 - Validation test of granular targets for high-power beam applications



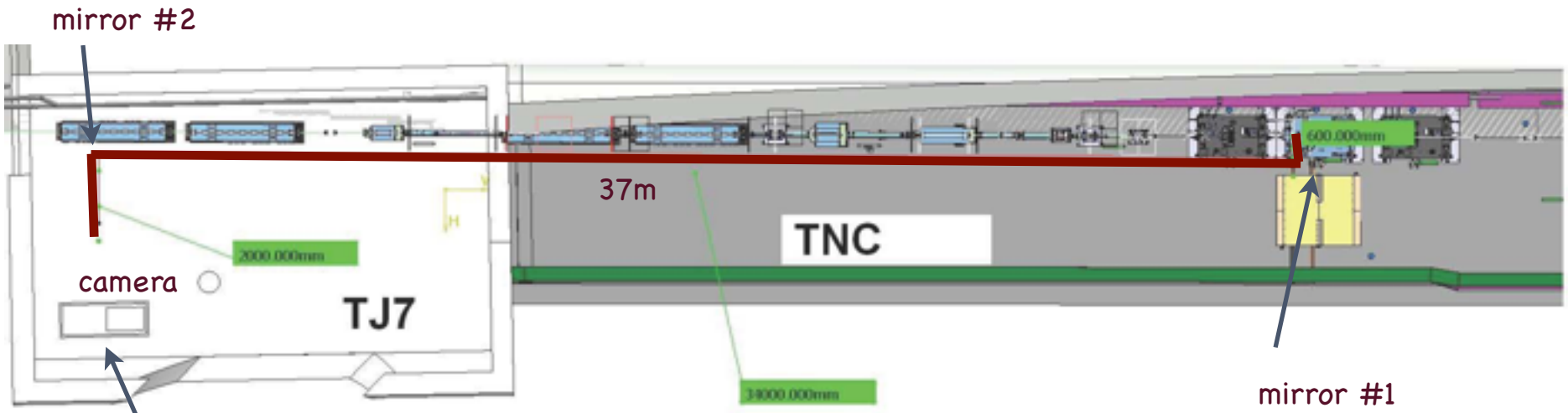
target sample - W powder:
- 30cm long, 6mm diameter
- <grain size> ~100 um

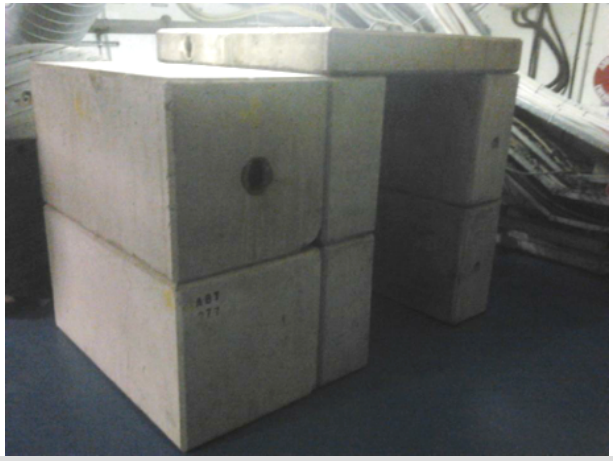
HiRatMat Instrumentation :
- fast photography - at 40m distance !!!
  - due to radiation to protect the camera



Experiment Highlights

- Online instrumentation
  - fast photography, LDV measurements, diamond detectors



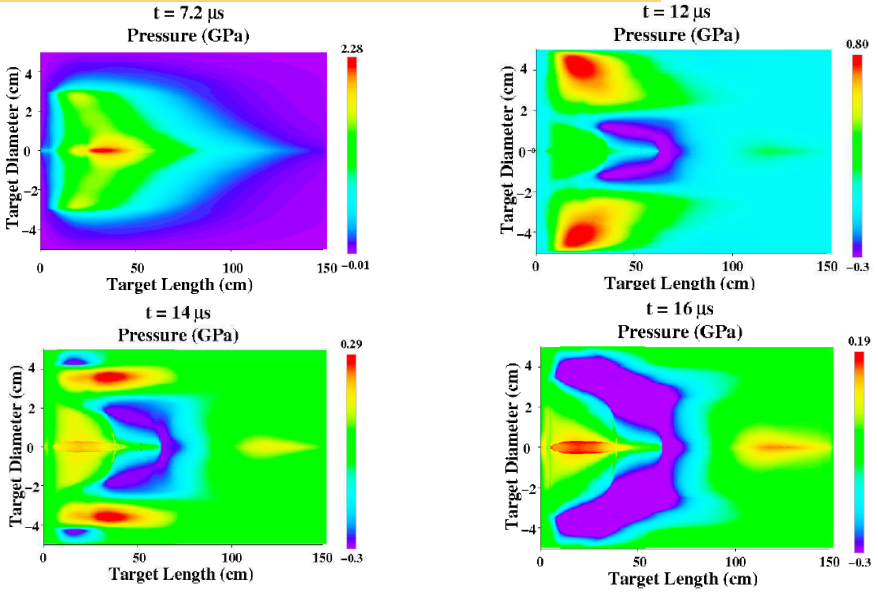


Share instrumentation and experience among users

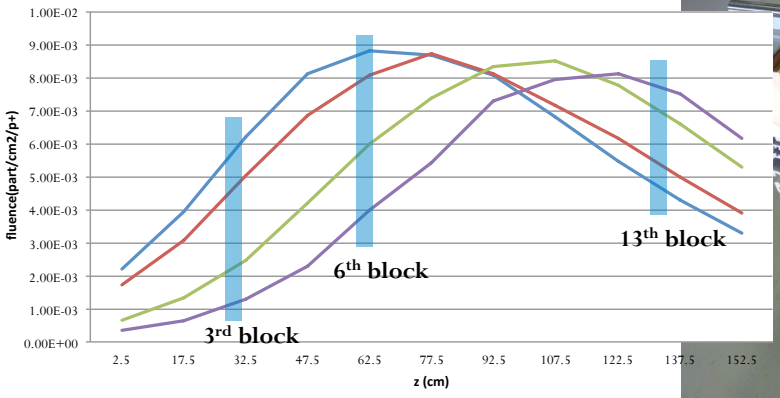
Experiment Highlights

HRMT12 - HEDM damage experiments

pressure evolution - beam sigma = 0.5mm

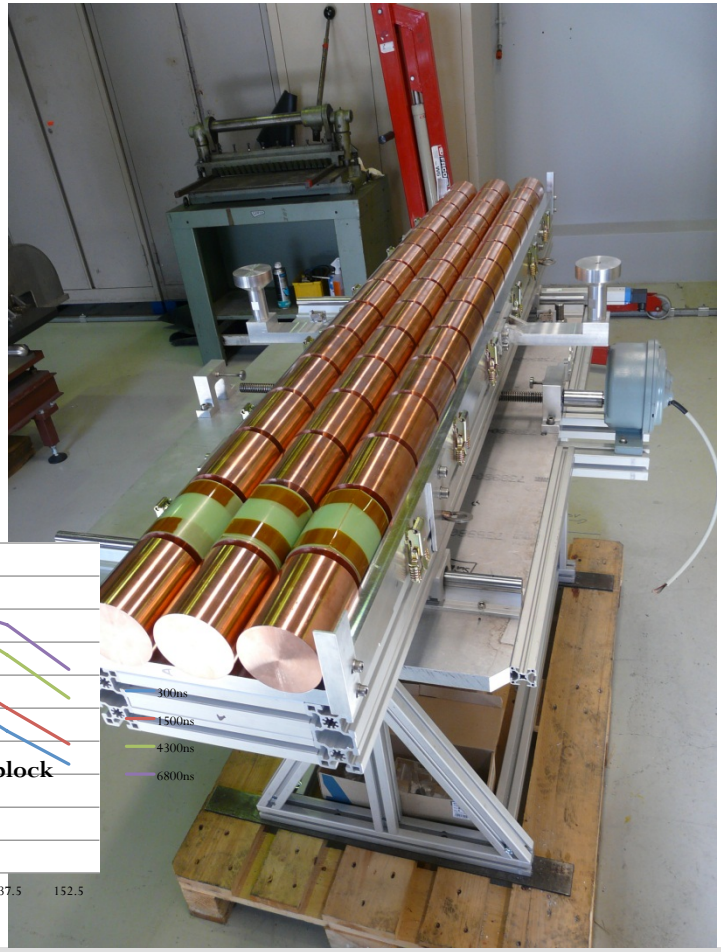


(0.1mm beam sigma)



target sample - Cu rods:

- 3 Cu rods, 15 cylinders, 8cm diam, 10cm long

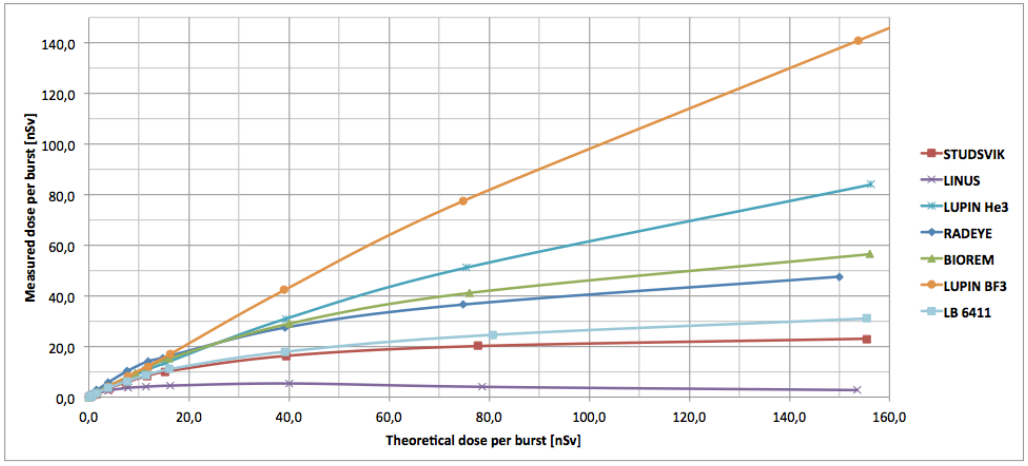


online monitoring

- 3 diamond detectors

Experiment Highlights

- HRMT15- Test of RP instrumentation in pulsed fields
  - time evolution of the radiation field, calibration of detector response



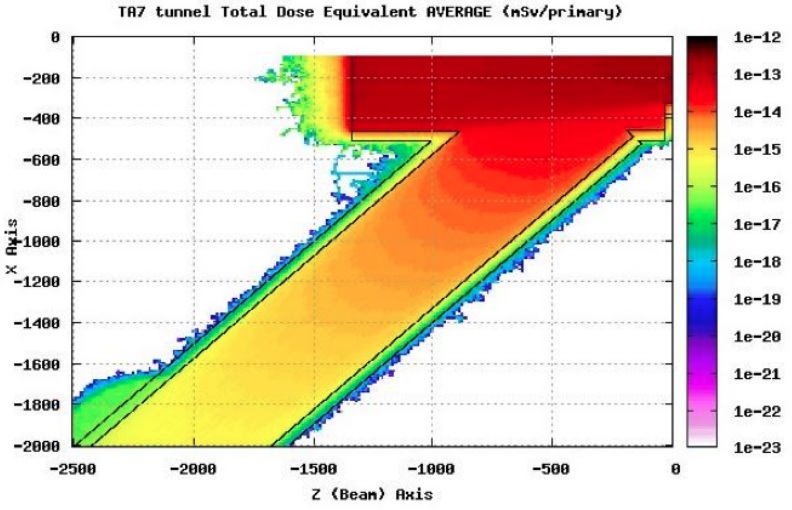
RP detector response measured in a 68MeV pulsed proton beam (EURADOS WG-II) at HZB-Berlin

- 5E9 - 1.7E11 protons/pulse (single bunch) ==> 5 to 170nSv in the detector

- Opens HiRadMat to a new community very interested to do experiments at CERN

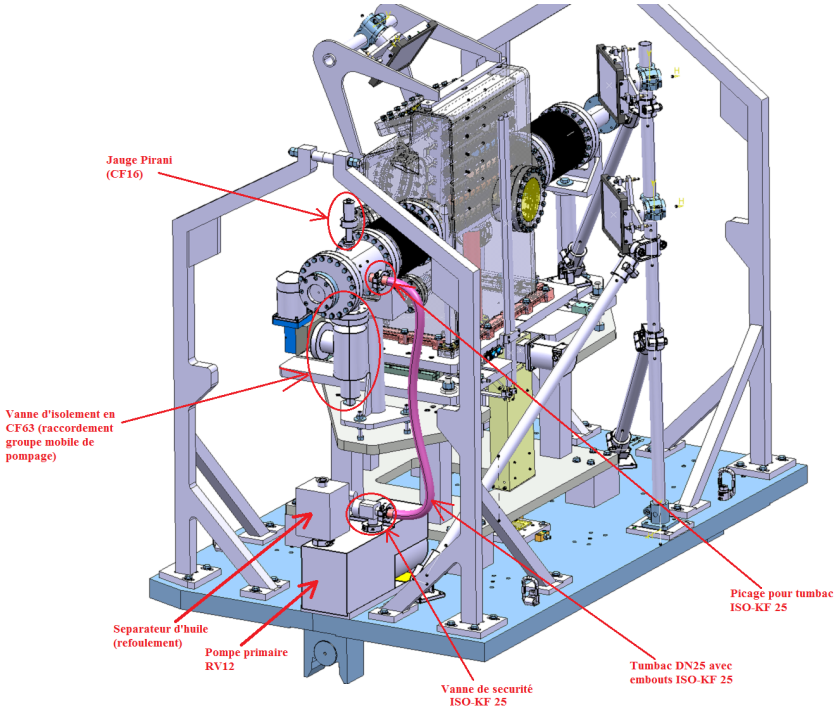
HiRadMat is the ideal place for the detector characterization:

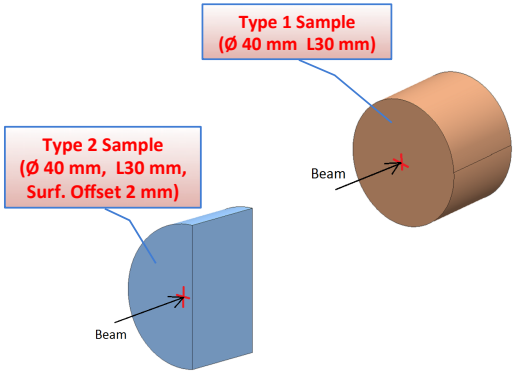
- uniform stray radiation field
- 90% of the total dose is coming from neutrons

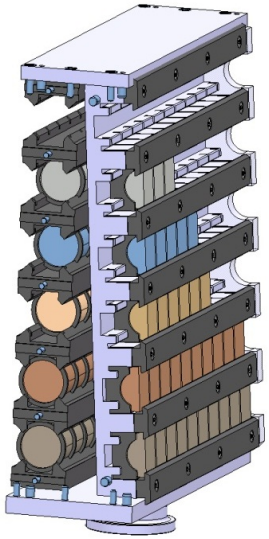


Experiment Highlights

HRMT12 - Material characterization for LHC collimators





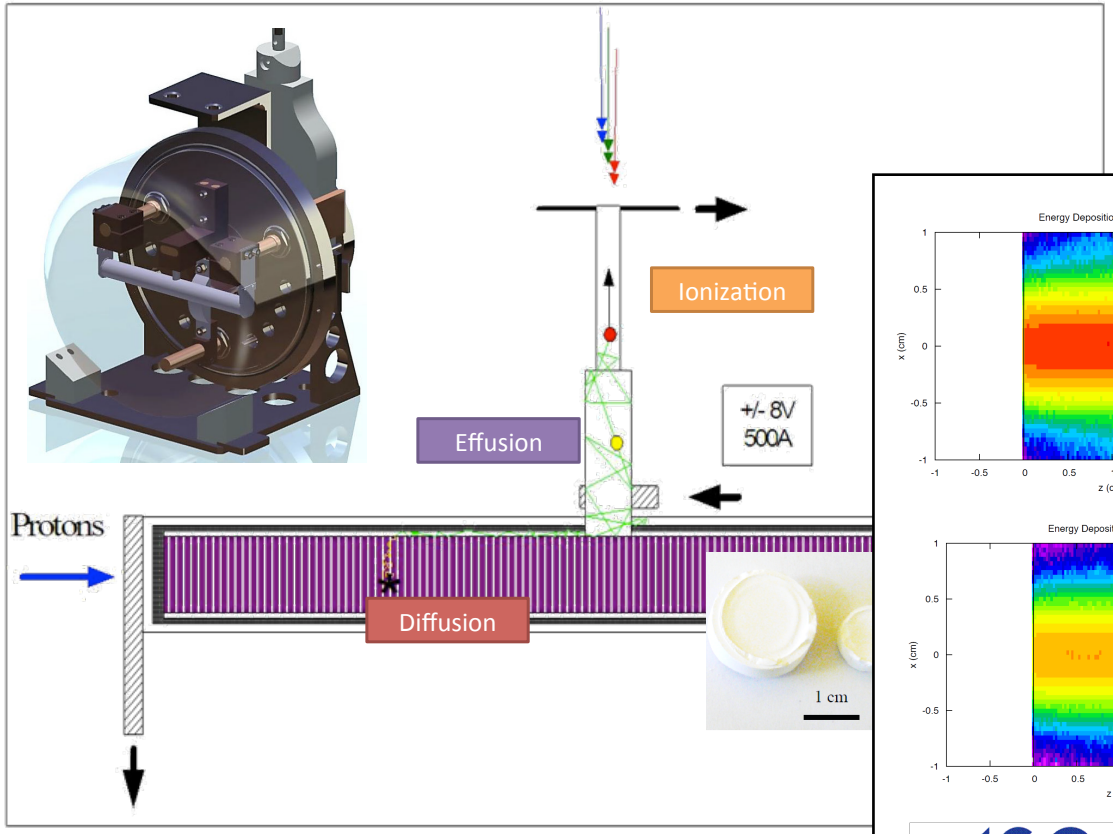


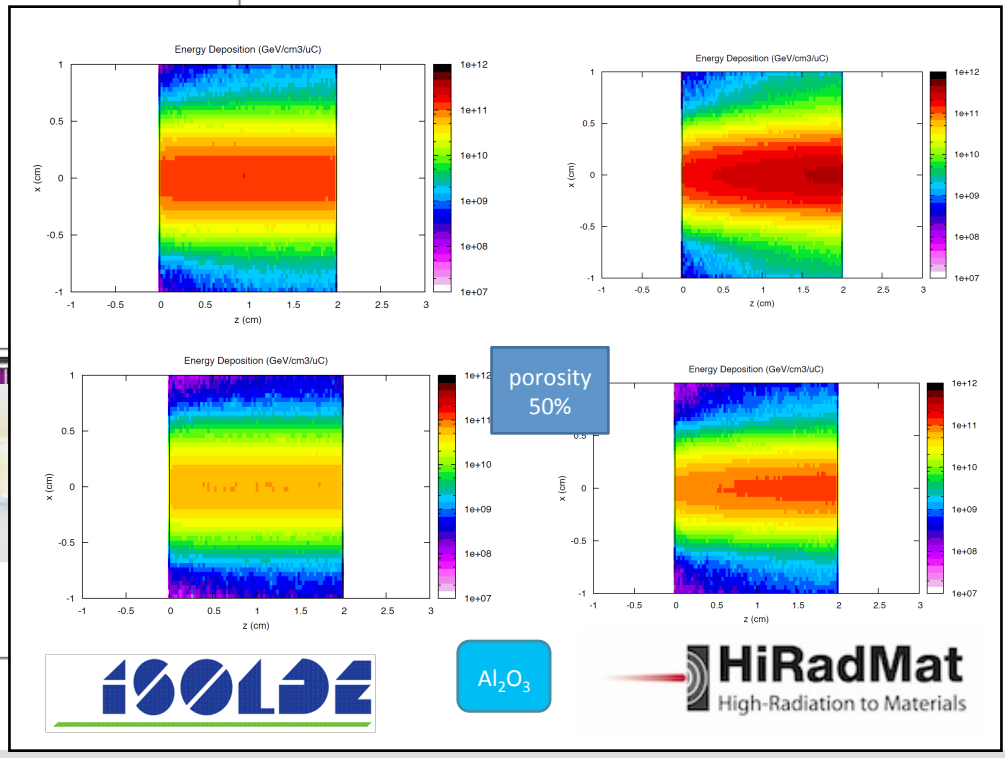
Sample holder

- **6 different materials** (Inermet 180, Glidcop, Mo, Cu-Diamond, Mo-Diamnod, Mo-C)
- medium & high intensity tests
- 90% of the total dose is coming from neutrons
- Each sample holder tier can host up to **10 specimens**
- Extensive real time data acquisition
- Post mortem analysis

Experiment Highlights

- HRMT01 - Tests at HiRadMat of advanced SiC and Al_2O_3 as model targets for radioisotope beam production





Summary

Summary

- Mission accomplished thanks to the hard work of many CERN teams
  - last details and improvements in the facility during shutdown

Summary

- Mission accomplished thanks to the hard work of many CERN teams
  - last details and improvements in the facility during shutdown
- Preparing and looking forward to the first experiments and TA for 2012

Summary

- Mission accomplished thanks to the hard work of many CERN teams
  - last details and improvements in the facility during shutdown
- Preparing and looking forward to the first experiments and TA for 2012
- Looking for more clients beyond 2014
  - any publicity is welcome !!