Towards DRD1-WG7
(common test facilities)

G. Iaselli, A. Ferretti, R. Guida, E. Oliveri, G. Tsipolitis

Set the Scene

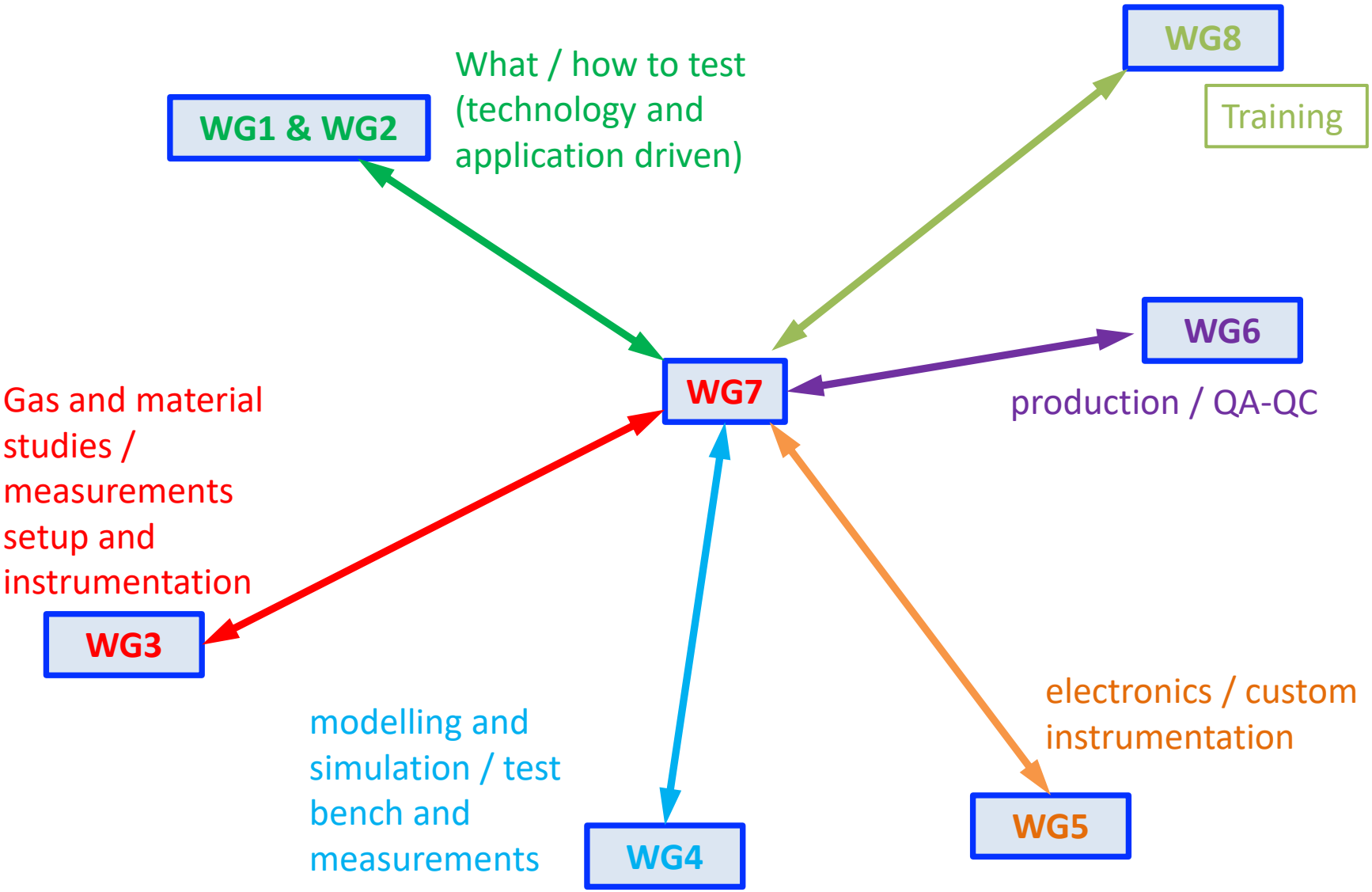
- WG7 will supply to the collaboration the tools needed for the development/testing of different type of gaseous detectors.
- The main goal is to facilitate the collaboration members in accessing the different facilities.
- Avoid duplication of effort and enhance the sharing of HW/FW/SW among the collaboration members

WG7 scope

- Common to all the gaseous detector technologies (HW & SW)
- Create a network of labs/facilities
- Cluster groups with common interests
- Support “local” facilities of “global” interest
- Facilitate access through local contact member of the collaboration
- Support common development in instrumentation

TASKS FOR THE PROPOSAL ??

WG7 and links with other working groups



Topics

Survey Results

RD51 & GIF++ Experience on Common Facilities

- **Common test beam**
- **Common Laboratories (copy paste of “test beam” remarks).**

List of Available Facilities (beyond DRD1)

Potential Objectives and Tasks

Topic (I)

THE SURVEY

The SURVEY

A: Detector Characterization Laboratory
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G: Electronics Workshop
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J: Radioactive Sources (active, passive)
K: Irradiation Facilities
L: Test Beam
M: Other

Existing Facilities @ Institutes

TO BE CHECKED

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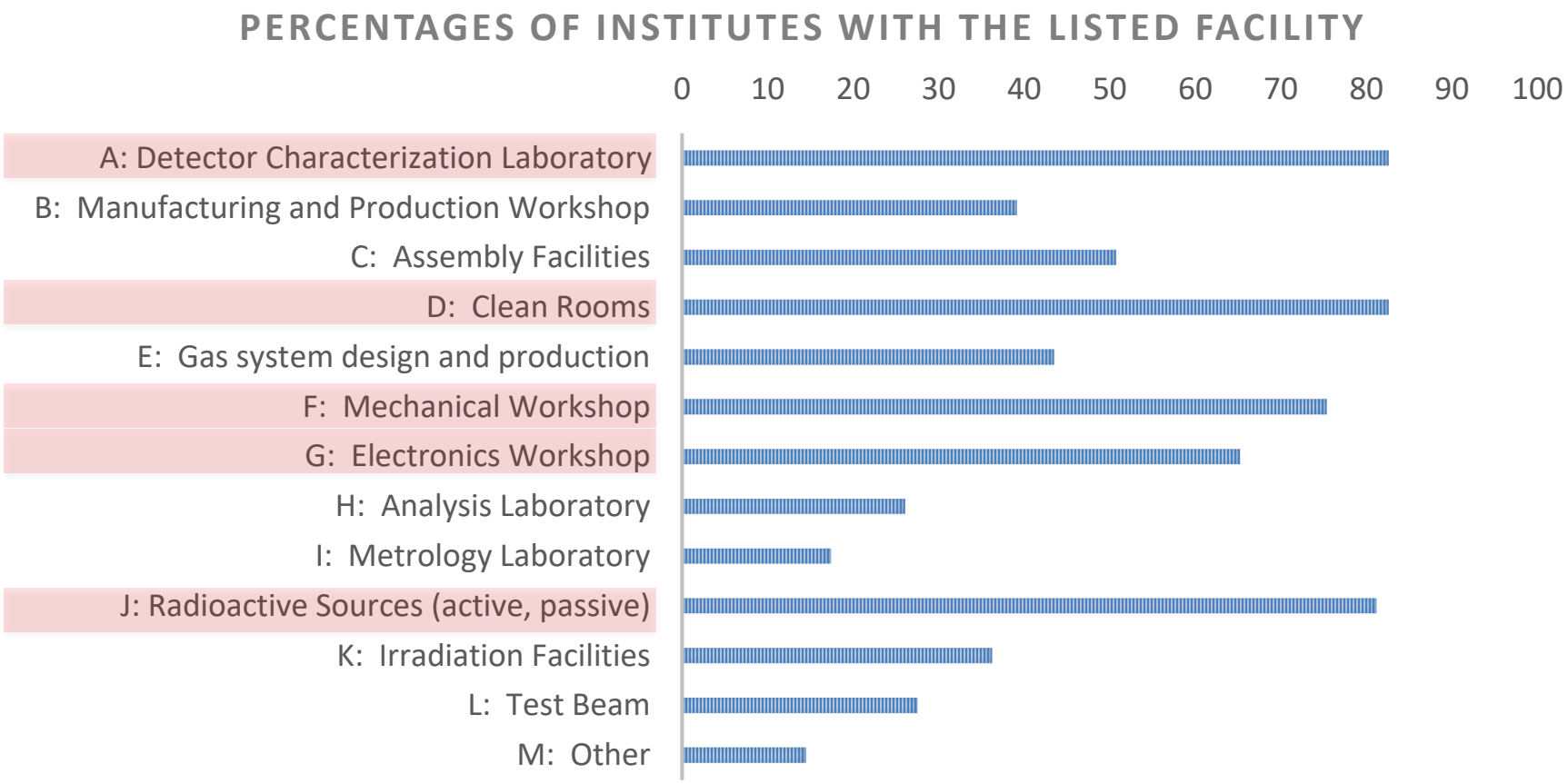
The SURVEY


PERCENTAGES OF INSTITUTES WITH THE LISTED FACILITY
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A: Detector Characterization Laboratory
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Institute	A	B	C	D	E	F	G	H	I	J	K	L	M
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IFUSP								LAMFI (Laboratory for Material Analysis with Ion			LAMFI (Laboratory for Material Analysis with Ion		
	1												DESY beam test station
											A Cs137 gamma irradiation facility		
												The Van de Graaf accelerator. The energy	
	1			1						1		Ion beams	
		Wiring machines: process need to ask the person in										test beam facility	
		MPGD Saclay workshop											
forschung GSI GmbH													
Maximilians-University of Wl¨urzburg											CO97 accelerator for	CO97 accelerator for	
h-Institute for Physics, Munich											Heavy Ion (p-Cl) test	Heavy Ion (p-Cl) test	
Institut, Heidelberg University											beam facility (energy up to	beam facility (energy up to	
Institut, University of Bonn	MAPS and RPC detector	MAPS and RPC detector	MAPS and RPC detector	MAPS and RPC detector						MAPS and RPC detector			
chan University	ELSA 3 GeV electron	ELSA 3 GeV electron	ELSA 3 GeV electron	ELSA 3 GeV electron						ELSA 3 GeV electron	ELSA 3 GeV electron	ELSA 3 GeV electron	
Institute					Bronze gas mixing system								large scale cosmic test
ational Center of Scientific Research "Demokritos"													stand
TU Athens											High intensity neutron		
pose Institute											accelerator facility		
ce Education and Research, Bhubaneswar	We have a small detector			We have a small detector							access to the tandem		
ew University of Jerusalem	1. Gas system with 5			1. Gas system with 5						1. Gas system with 5	1. Gas system with 5		1. Gas system with 5
Weizmann		1				Cleanroom, electronics and	Cleanroom, electronics and						
Bari INFN Section and Department of Physics	We have several fully	We have several fully	We have several fully							We have several fully			
	Laboratory for detector					Laboratory for detector	Laboratory for detector			Laboratory for detector			Laboratory for detector
Gran Sasso Science Institute													Gran Sasso Science
INFN - Laboratori Nazionali di Frascati	Detector Characterization												Institute, Italy + PoP
INFN - Sezione di Roma Tre	Test lab for detector					Test lab for detector					Test lab for detector		Ultraviolet Laser (266nm)
INFN Bari	1. Gas system with 5			1. Gas system with 5							characterization: X-Ray		100 Hz - 50uJ/pulse - Tm
INFN Bari, RPC-LHCb	A list of facilities has been		A list of facilities has been	A list of facilities has been		A list of facilities has been	A list of facilities has been		A list of facilities has been	A list of facilities has been	Ultraviolet Laser (266nm)		A list of facilities has been
INFN Ferrara	simply given in the		simply given in the	simply given in the		simply given in the	simply given in the		simply given in the	simply given in the	100 Hz - 50uJ/pulse - Tm		simply given in the
INFN Sez. di Roma	https://tinyurl.com/		https://tinyurl.com/	https://tinyurl.com/		https://tinyurl.com/	https://tinyurl.com/		https://tinyurl.com/	https://tinyurl.com/			https://tinyurl.com/
INFN Sezione di Lecce, via Arnesano, Lecce, Italy				Electronic workshop,		Electronic workshop,	Electronic workshop,	Electronic workshop,					UV laser facility for
Dipartimento di Matematica e Fisica "Ennio De Giorgi" - Università del Salento, Via Arnesano, Lecce, Italy				Mechanical Workshop		Mechanical Workshop	Mechanical Workshop	Mechanical Workshop					strange detector
INFN Sezione di Padova											LNL accelerator and	LNL accelerator and	
INFN-Bari (neutrino oscillation group)	1		1	1	1	1	1		1	1	irradiation facilities	irradiation facilities	
INFN-Trieste	1	1	1	1		1	1			1			1
Istituto Nazionale di Fisica Nucleare - Sezione di Frascati	laboratory for rpc			X-ray source, gas system							X-Ray		
Laboratori Nazionali Frascati INFN	characterization, front			for ultrastable gases							laboratory for rpc		
Università & INFN Sezione di Pavia				LEAN irradiation facility							characterization, front	LEAN irradiation facility	
Università di Roma "Tor Vergata" and INFN Sezione di Roma Tor Vergata	Our research lab, with	Our research lab, with		Our research lab, with	Our research lab, with	Our research lab, with	Our research lab, with				Clean room		Our research lab, with
Kobe University	facilities for testing RPC	facilities for testing RPC		facilities for testing RPC	facilities for testing RPC	facilities for testing RPC	facilities for testing RPC						facilities for testing RPC
AGH University of Science and Technology in Krakow		directly none, via		clean room,									directly none, via
AstroCeNT, Nicolaus Copernicus Astronomical Center of the Polish Academy of Sciences		collaborations to be		cryostats, cryogenic									collaborations to be
Institute of Plasma Physics and Laser Microfusion		general purpose detector		infrastructure and									general purpose detector
Jagiellonian University, Faculty of Physics, Astronomy and Applied Computer Science		characterization		mechanical laboratory									characterization
LIP - Laboratory for Instrumentation for Particle Physics													
LIP, Laboratório de Instrumentação e Física Experimental de Partículas	Mechanical workshop and	1				Mechanical workshop and				Mechanical workshop and			
IFIN-HH						electronics lab, mechanics	electronics lab, mechanics						electronics lab, mechanics
Centro de Astropartículas y Física de Altas Energías / Universidad de Zaragoza	General detector lab with												
Instituto Galego de Física de Altas Enerxías													
Universidad de Oviedo													
USC/IGFAE								In collaboration with					In collaboration with
European Spallation Source ERIC													
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CERN (STRAW/SHINE)													
Paul Scherrer Institut													
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Bursa Uludag University	1	X-ray tube, disc sources	X-ray tube, disc sources	X-ray tube, disc sources	1	1	1	X-ray tube, disc sources	X-ray tube, disc sources	1			
University of Liverpool				Clean room, mechanical		Clean room, mechanical							
University of Manchester				workshop, designs, PCB		workshop, designs, PCB							
Facility for Rare Isotope Beams (FRIB), Michigan State University (MSU)				expertise in large vacuum									
Florida Institute of Technology				systems and related R&D									
Stony Brook University				Clean room, X-ray									
Thomas Jefferson National Accelerator Facility (TJNAF, Jefferson Lab)				workshop									
University of Hawaii at Manoa				Characterization for detector									
University of Wisconsin-Madison				production			electronics lab, physical						

Existing Facilities @ Institutes potentially accessible to DRD1 members

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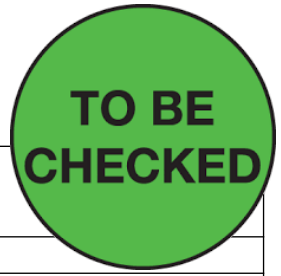
Further Investigation required.

Interesting facilities missing

Detector Laboratory



Institute
AGH University of Science and Technology in Krakow
Bari INFN Section and Department of Physics
Bose Institute
Bursa Uludag University
Centro de Astropartículas y Física de Altas Energías / Universidad de Zaragoza
CERN
Helsinki Institute of Physics - University of Helsinki
INFN - Laboratori Nazionali di Frascati
INFN - Sezione di Roma Tre
INFN Bari, RPC-LHCb
INFN Ferrara
INFN-Bari (neutrino oscillation group)
INFN-Trieste
Institute of Plasma Physics and Laser Microfusion
Jagiellonian University, Faculty of Physics, Astronomy and Applied Computer Science
Laboratori Nazionali Frascati INFN
LIP, Laboratório de Instrumentação e Física Experimental de Partículas
Max-Planck-Institute for Physics, Munich
National Institute of Science Education and Research, Bhubaneswar
Physikalisches Institut, University of Bonn
Sofia University "St. Kliment Ohridski"
Università di Roma "Tor Vergata" and INFN Sezione di Roma Tor Vergata
Vrije Universiteit Brussel (+Ghent University)
Weizmann
USC/IGFAE

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Irradiation facilities

TO BE CHECKED

Institute
Australian National University
Bolu Abant İzzet Baysal University
CERN
Florida Institute of Technology
GSI Darmstadt and Forschungszentrum Jülich
Helmholtzzentrum für Schwerioneforschung GSI GmbH
IFUSP: Instituto de Física da Universidade de São Paulo
INFN - Sezione di Roma Tre
INFN Bari
INFN Sezione di Padova
Institute of Nuclear and Particle Physics, National Center of Scientific Research "Demokritos"
Istituto Nazionale di Fisica Nucleare - Sezione di Frascati
Kobe University
Laboratori Nazionali Frascati INFN
National Institute of Science Education and Research, Bhubaneswar
NTU Athens
Paul Scherrer Institut
Physikalisches Institut, University of Bonn
Università & INFN Sezione di Pavia
University of Science and Technology of China (USTC)

Further Investigation required.

Interesting facilities missing

The SURVEY

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Test Beams

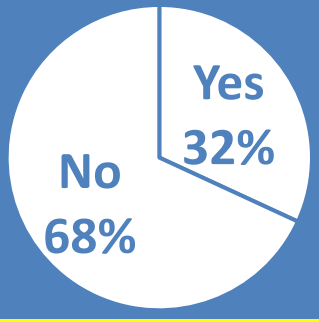
Institute
CERN
European Spallation Source ERIC
GANIL
GSI Darmstadt and Forschungszentrum Jülich
Helmholtzzentrum für Schwerioneforschung GSI GmbH
IJCLab/IN2P3/CNRS
INFN Sezione di Padova
Institute of Experimental and Applied Physics, CTU in Prague
Paul Scherrer Institut
Physikalisches Institut, University of Bonn
Università & INFN Sezione di Pavia
USC/IGFAE

Further Investigation required.

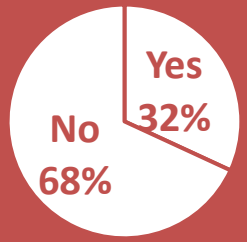
Interesting facilities missing

The SURVEY

CONTRIBUTING TO THE MANAGEMENT AND OPERATION OF EXISTING/PLANNED FACILITIES/SUPPORTS

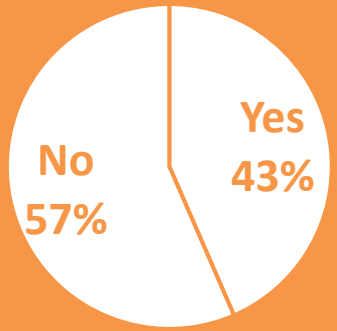


CONTRIBUTING AND/OR FINANCIALLY SUPPORTING THE DEVELOPMENT/CONSTRUCTION OF SPECIFIC SUPPORTS FOR EXISTING OR NEW FACILITIES?



We need more information or one more iteration

CONTRIBUTING AND/OR FINANCIALLY SUPPORTING THE USAGE OF SPECIFIC SUPPORTS



The SURVEY

7. Common Test Facilities: Comments/Notes
Already contributing to common facilities for studies on eco-friendly gas mixtures in the framework of the RPC Eco-gas collaboration at GIF++. also due to our localisation, direct contributions to facilities abroad is quite hard. Nevertheless, despite this limitation, we are open to contribute on best effort basis.
Continue contribution and financial support as done up to now through RD51 collaboration for the maintenance and use of Test beam facility. We can do the same for irradiation facility (GIF++)
Depends on the actual financial condition of the faculty.
ELSA test beam facility and FTD are in principle open to outside groups. Would like to develop this further.
Financing only in case of the experiment using the detectors is approved by INFN
Following what done so far for RD51, our group is interested in maintaining and financing common tools, Supports, facilities.
In general, it will be possible to directly contribute to common facilities and Supports that are based at CERN.
In kind contributions can be considered for relevant facilities.
Needs to be discussed in the framework of bilateral agreement or formalised collaboration
Of course it would be a (YES), if there is a Support offered, that we urgently need for the fulfilment of o
In general there should be a way of funding that.
Our group contributes to the running of the ANU's Heavy Ion Accelerator Facility, which could be used f
Our main interest now is to keep our accelerator in operation.
Our possible financial support to the activities mentioned above depends on the previous support from
Previous aspects related to financial support has to be discussed with INFN.
PSI operates the Swiss Research Infrastructure for Particle Physics CHRISP (https://www.psi.ch/en/ltp/facilities). The secondary pion and muon beams and the proton irradiation facility PIF are part of CHRISP. PSI will continue to operate and maintain these facilities.
support depends on the actual facility in question.
Support of common test beams and common facilities as GIF++
The Yes answer applies to all facilities/Supports existing or planned at our institute (University of Science and Technology of China, USTC)
To be discussed. Generally, yes.
we (as group) do not have the human/financial resources for this kind of support - this a question rather to be made to funding agencies
we are interested to continue the collaboration at GIF++ for ecogas studies of RPC
We will support the specific Supports we need
With common projects, the institute can contribute to the mentioned above

The SURVEY

STILL MISSING.. WHAT THE GROUPS NEED

The SURVEY

- Detector development laboratories
- Test beam
- Irradiation facility
- Laser
- Cosmic ray test bench

Detector common test facilities

- Ageing Study Facility
- Outgassing Study Facility
- Gas studies facility
- Chemistry and material laboratory

Specialized characterization facilities

- Clean Room(s)
- Detector Mechanical workshop(s)
- Gas system workshop(s)
- Metrology facility

Support Facilities
(not testing but assembly,..)

RD51 Experience on Common Facilities

Common test beam

DISCLAIMERS

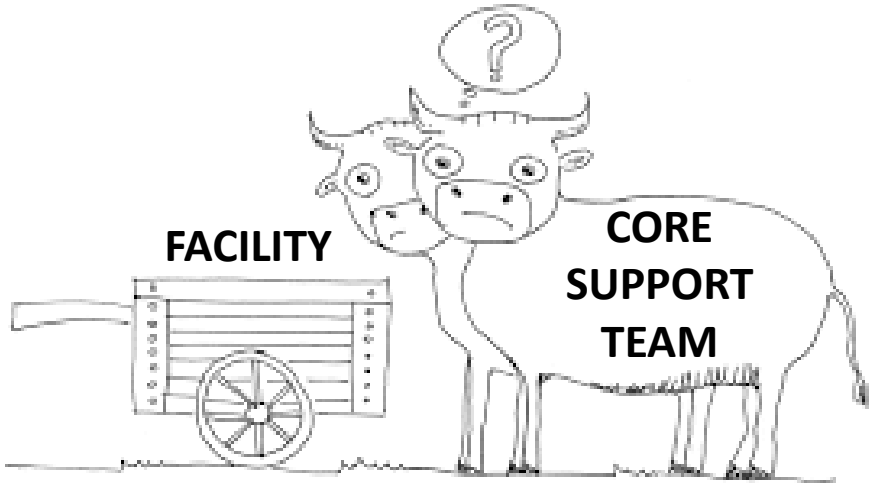
- Few aspects based on the **experience** in RD51 (**more on the collaborative aspects than the facility itself)**
  - Identify **core teams** before entering the details of the facility
  - RD51 test beam is **not an efficient data-farm**
  - It is a **collaborative support, no customers**
  - **Funding**
- **No claim on being the sole or best approach** to follow. It is reporting on experience for discussion

CORE TEAMS

“La charrue avant les boeufs"

“The cart before the horse”

Miniature from the 'Book of Hours with proverbs' - codex NAL 3134 (mid-15th century), Bibliothèque nationale de France, Paris.



Which one first?

RD51 Experience: first the core team

CORE TEAMS

RD51 Experience (from RD51 proposal)

It is important to **identify the team willing to <u>use AND support</u> the facility (at the same time)**.

OBJECTIVE: Design and maintenance of common infrastructure for detector characterization

TASK 1: Development and maintenance of a common Test-Beam Facility

- Construction and installation of the basic setup, including trigger and tracking devices, high precision mechanics, gas systems, laminar-flow cabinet and Supports;
- Definition of a flexible DAQ system, as well as a flexible control system to set up and monitor detector parameters;
- Definition of a common approach in data analysis and development of a common software framework for this task;
- Evaluation of possible integration of a magnet in the test beam set-up.

RD51 Team <u>using AND supporting</u> the common facility

TASK 2: Development of common irradiation infrastructures and irradiation test programme

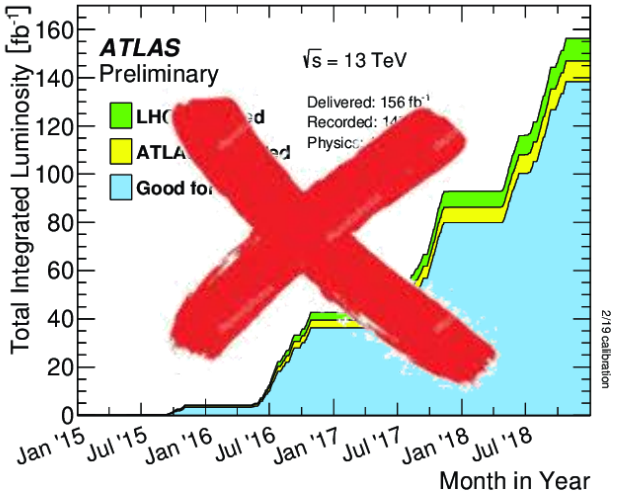
- Contribution to the design specifications of the new GIF++ Gamma-irradiation facility at CERN, in order to install a dedicated, permanent setup for the RD-51 collaboration;
- Develop a plan to use and contribute to the upgrade of the CERN PS-T7 proton and neutron facilities, for radiation-hardness characterization of detector components (assembly materials, electronics, etc).

(*)

(*) There is no agreement if we should consider it as a failure… so read “failed” as a personal comment (green to sweeten it). Nevertheless **<u>useful here to underline what we learnd in terms of proposal writing/tasks.</u>**

No RD51 Teams interested on <u>using AND supporting</u> the common facility

It is not an efficient data-farm..
It's for R&D



- **Flexible, dynamic, unpredictable**… with many **interactions** between groups/people..
- **Seed for new** projects/collaborations/ideas…
- **Training and learning** (youngers or beginners)..

RD51 Experience

Common test beams **<u>are highly inefficient</u>** for data taking. Several groups (= problems) running (=accesses) in parallel.

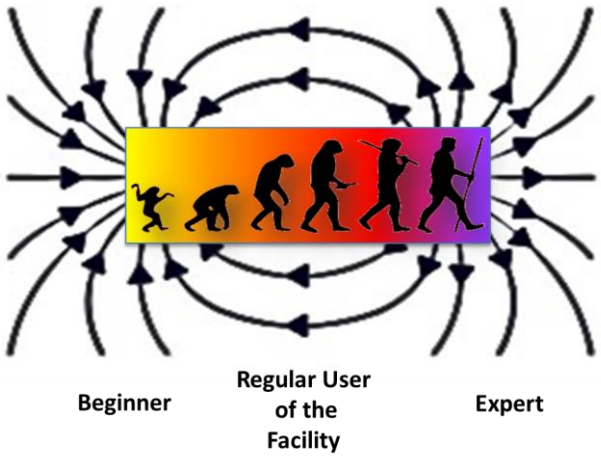
Common test beams are **<u>highly efficient</u>** in sharing (scientifically/technically) problems/solutions/ideas..

It is a…

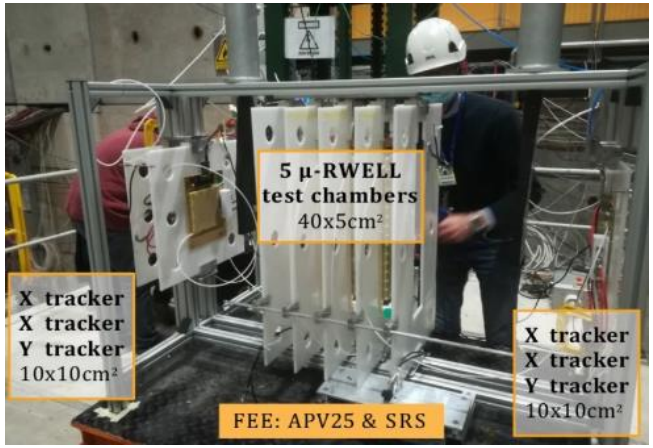
COLLABORATIVE SUPPORT, <u>NO CUSTOMERS</u> BUT COLLABORATORS

Just one example: the common trackers are **not run by the support team**. The collaboration will provide **<u>the available</u>** hardware, basic software, troubleshooting and help to the collaborators **(*)**… but the system will be run in an independent way by the interested group.

(*) The support is **<u>between collaborators</u>** and not exclusively from the core team.



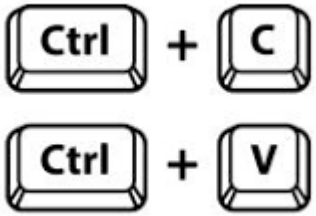
Groups growing within the common facilities (and later contributing to the common facilities).



Knowledge transfer between groups→
Dissemination of methods/electronics/…

RD51 Experience on Common Facilities

Common R&D Laboratories



Copy Paste all remarks/comments given for test beam

in particular about **core team**

A closer look…

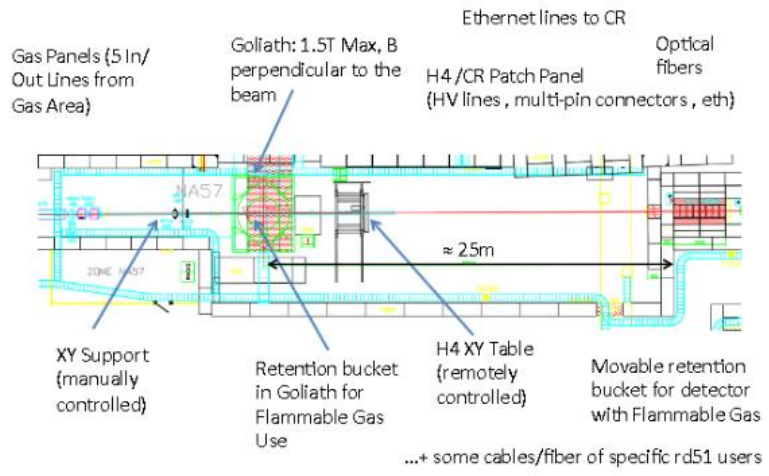
RD51 (Semi permanent) Test Beam installation at the CERN/SPS

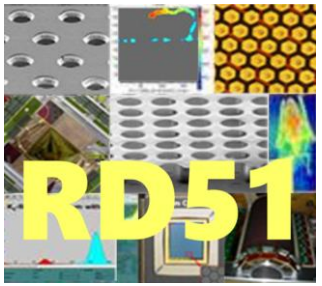
(about 3 periods of 2 weeks each per year)

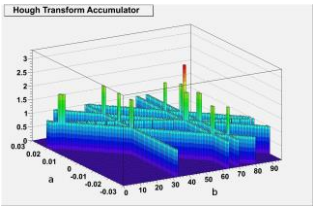
RD51 Test Beam @ CERN/SPS

You do a better use of the beam (parallel users) and you simplify the access for small groups and project

Infrastructures (gas, HV, LV, sensors,...)

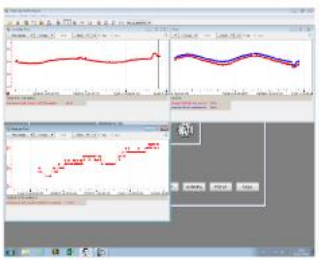




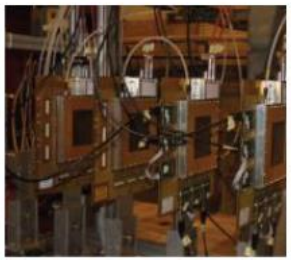


Remotely controllable platform (CERN SPS/NA)

RD51 DCS (Control and monitoring)



RD51 Trackers and SRS/APV25 DAQ



Mechanical support (Miranda)

HUMAN RESOURCES & FUNDING

Trackers:

- Detectors (3 detectors per station)
  - Bulk non-resistive micromegas
  - Bulk resistive micromegas
  - Triple GEM
- Readout Electronics
  - SRS & APV25 (*)
  - SRS & VMM3a (*)

Trigger:

- Scintillators and PMT (*)

Electronics from CERN e-pool:

- High voltage / Low voltage power supply
- NIM modules

DCS/Monitoring Units:

- Micro-controller based system

(*) Cost **shared** with, **GDD** and **AIDA2020/AIDAinnova**
(**) nowadays covered by CERN/NA

Core support team (today)

GDD team
Miranda ☺ (GDD/Tech)
NTUA team
WG5 (electronics)

Mechanics/supports:

- Trackers
- Rails and chariot in Goliath Magnet
- Flammable gas retailer boxes

Infrastructures/Supports:

- Gas connections between gas zone and exp. area (**)
- Cables between CR and experimental area (**)

Consumables:

- Standard gases (**)
- Gas pipes and connectors
- Cables and terminations
- …

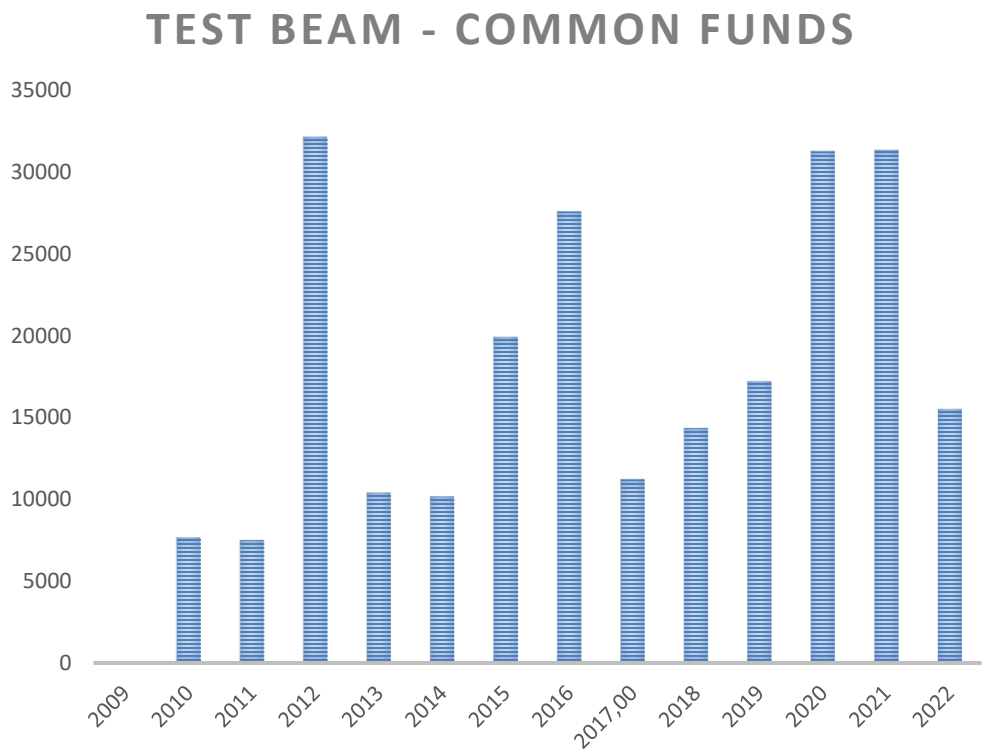
FUNDING (RD51)

1) The reported investment represents the **AVAILABLE RESOURCES** from the RD51 Common Funds ("light" collaboration in terms of common resources).

2) Additional resources, but still at similar level, were coming from support group (CERN GDD) and EU (AIDA*/Electronics)

3) Human resources from supporting groups (CERN/GDD, NTUA) not included

Taking all of this into account, available resources from Common Funds are on this scale.. Few tens kCHF/y



RD51 Common Funds: about 17kCHF/y in average

FUNDING (DRD1/?)

Few comments on funding, valid for all potential common test facilities

- Available facilities connected to potential members of DRD1
  - Identify key aspects that can facilitate the access to the facility (approvals, local infrastructures and supports).

Visiting Group Funds

- Common facilities (existing and potential)
  - Identify a core team willing to support a common facility
  - Identify what can be done in a collaborative way on the specific facility

Common Funds

- Highly demanding projects (resources)

Work Packages
Ext. resources and/or from interested groups

Work Packages (?) if relevant resources will become available to support specific projects (or a way eventually to ask for ext. resources as EU,..)

Irradiation Facility

- Detector Research and Development Theme:
  - DRDT 1.1 - Improve time and spatial resolution for gaseous detectors with long-term stability.
  - R&D challenge: Radiation hardness and stability of large area detectors up to integrated charge > C/cm^2, C/cm: ageing issues and discharges
  - Hadron physics 10^{13} neq/cm^2/year
- Synergies between technologies:
  - DRDT 1.1 and R&D challenge concerning radiation hardness and stability are common to many gaseous detector technologies:
    - GEM, THGEM, FTM, Micromegas, RPC, MRPC, PICOSEC, u-RWELL, …
  - and to many experimental facilities:
    - HL-LHC, Higgs-EW-Top factories (ee), muon collider, hadron physics, FCC-hh

From ECFA roadmap

Need of irradiation facilities to go up to > C/cm^2 for large area detectors

Facility	Technologies	Challenges	Most challenging requirements at the experiment
HL-LHC	RPC, Multi-GEM, resistive-GEM, Micromegas, micro-pixel Micromegas, μ-RWELL, μ-PIC	Ageing and radiation hard, large area, rate capability, space and time resolution, miniaturisation of readout, eco-gases, spark-free, low cost	**(LHCb)**: Max. rate: 900 kHz/cm² Spatial resolution: ~ cm Time resolution: O(ns) Radiation hardness: ~ 2 C/cm² (10 years)
Higgs-EW-Top Factories (ee) (ILC/FCC-ee/CepC/SCTF)	GEM, μ-RWELL, Micromegas, RPC	Stability, low cost, space resolution, large area, eco-gases	**(IDEA):** Max. rate: 10 kHz/cm² Spatial resolution: ~60-80 μm Time resolution: O(ns) Radiation hardness: <100 mC/cm²
Muon collider	Triple-GEM, μ-RWELL, Micromegas, RPC, MRPC	High spatial resolution, fast/precise timing, large area, eco-gases, spark-free	Fluxes: > 2 MHz/cm² ($\theta<8^0$) < 2 kHz/cm² (for $\theta>12^0$) Spatial resolution: ~100μm Time resolution: sub-ns Radiation hardness: < C/cm²
Hadron physics (EIC, AMBER, PANDA/CMB@FAIR, NA60+)	Micromegas, GEM, RPC	High rate capability, good spatial resolution, radiation hard, eco-gases, self-triggered front-end electronics	**(CBM@FAIR):** Max rate: <500 kHz/cm² Spatial resolution: < 1 mm Time resolution: ~ 15 ns Radiation hardness: 10^{13} neq/cm²/year
FCC-hh (100 TeV hadron collider)	GEM, THGEM, μ-RWELL, Micromegas, RPC, FTM	Stability, ageing, large area, low cost, space resolution, eco-gases, spark-free, fast/precise timing	Max. rate 500 Hz/cm² Spatial resolution = 50 μm Angular resolution = 70 μrad (η=0) to get Δp/p≤10% up to 20 TeV/c

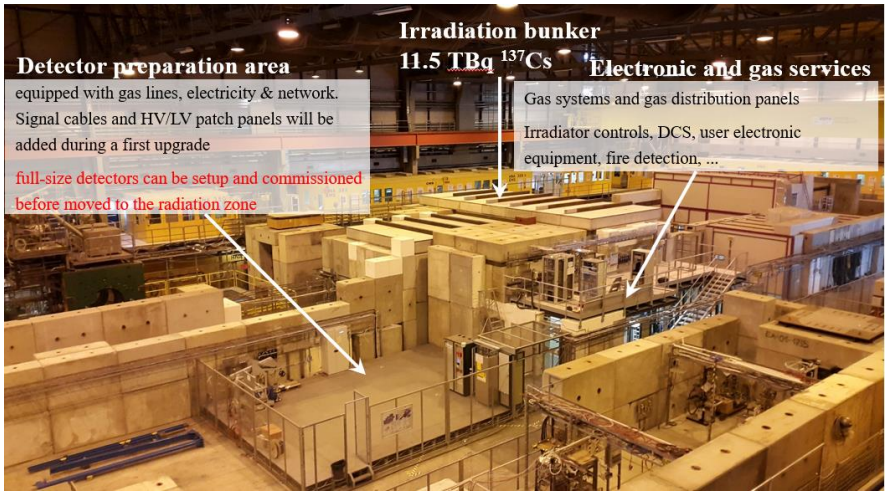
Irradiation Facilities

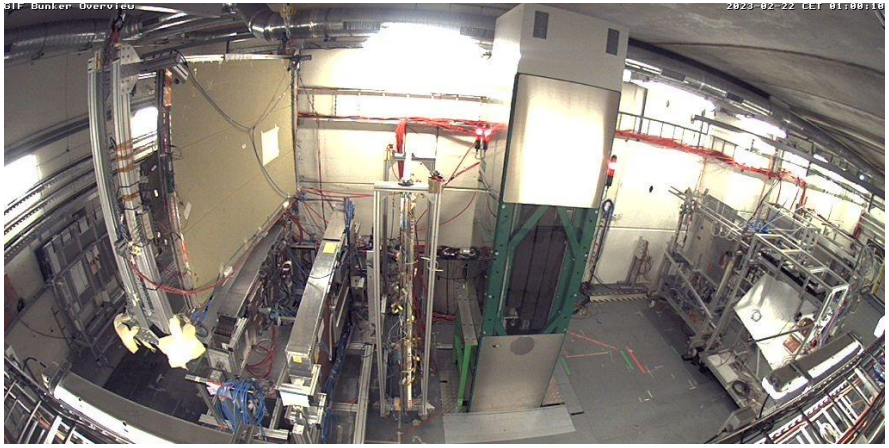
Clear need of irradiation facilities to go up to C/cm2 for large area detectors

- DRD1 collaboration:
  - Irradiation
    - Radioactive sources, Co, Cs, X-ray, proton, neutron
  - Test beam characterization
    - p, α, d, n, e-, π, μ, low energy ion beam, heavy nucleous

Irradiation Facilities

GIF++ example





Development of common infrastructures

≈ 0.4 C/cm^2/y at 3.5 m
More space needed near the source?
Higher intensity source?

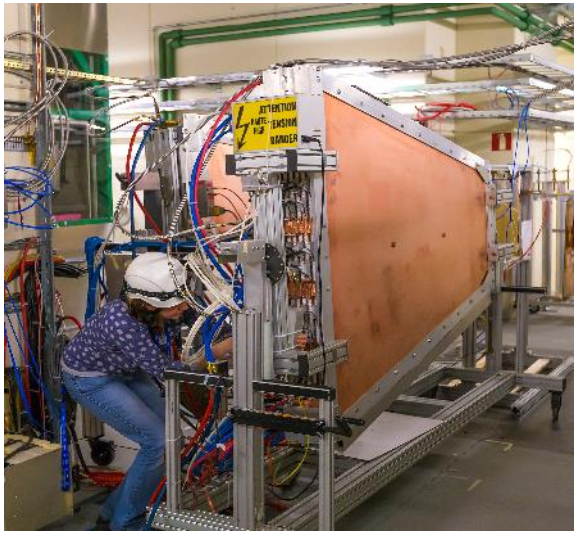
Potential synergies between technologies

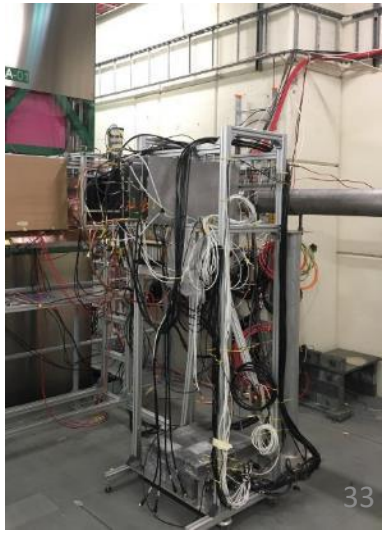
Common goals:

- Detector validation up to new expected dose
- Detector and electronic development
- Performance of *recent* detector developments
- Test on real size detectors (>> m^2) and prototype
- Studies with new environmentally friendly gases
- New gas systems for detector upgrades

different types of detector technologies:

- DT, MDT
- CSC
- RPC, iRPC, GRPC
- MM
- GEM
- sTGC
- …



Specialized characterization facilities

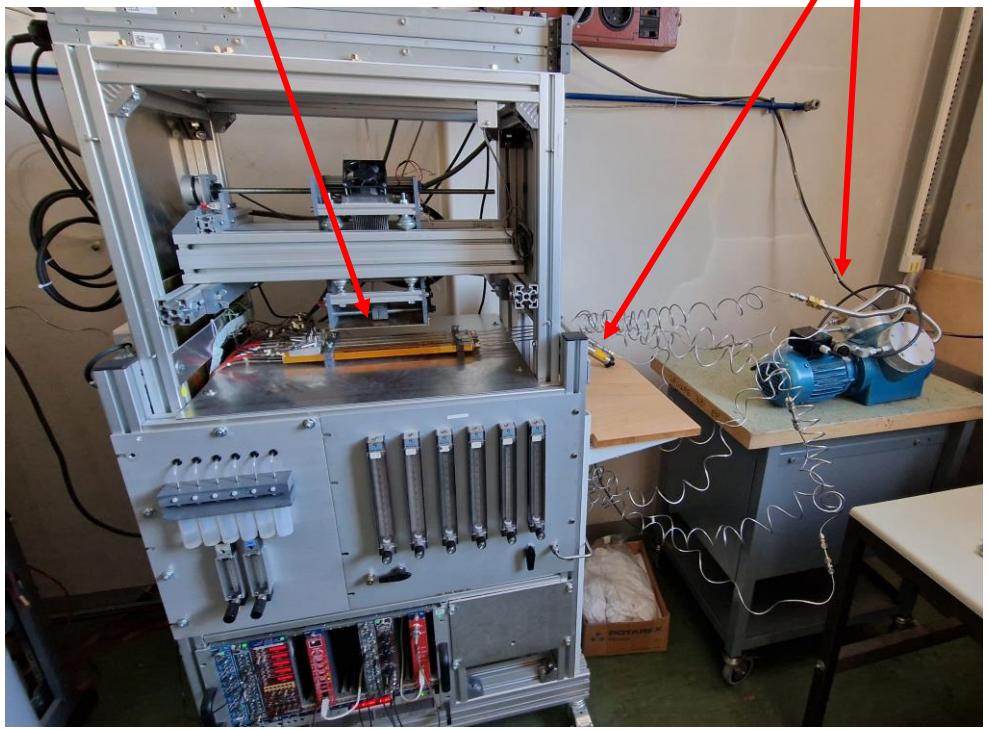
An example for Outgassing lab

Use to validate detector components and all components used for the gas systems at CERN

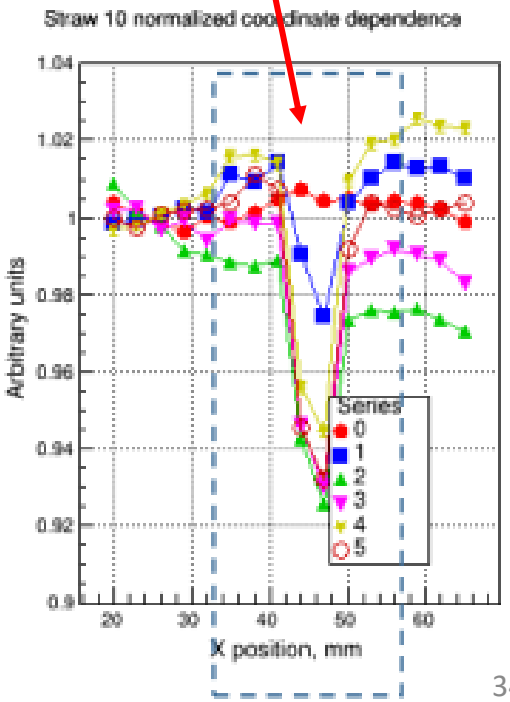
Common to all experiments and all detector technologies

Straw tube used for test

Components under test



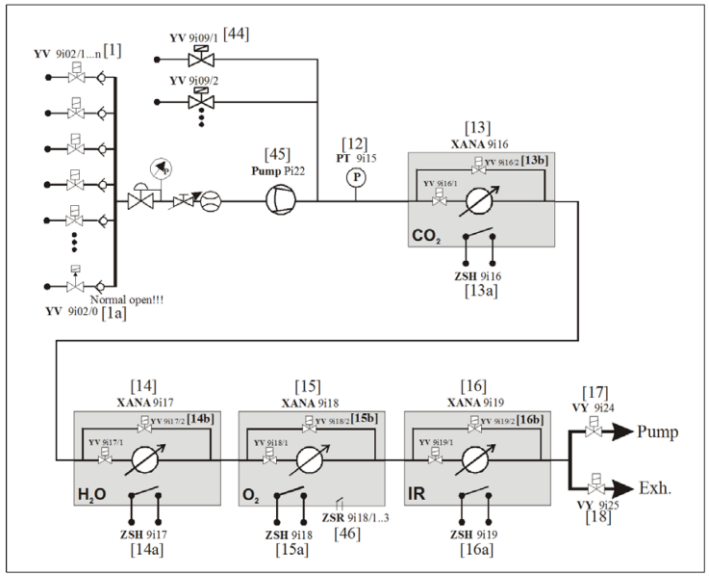
Result



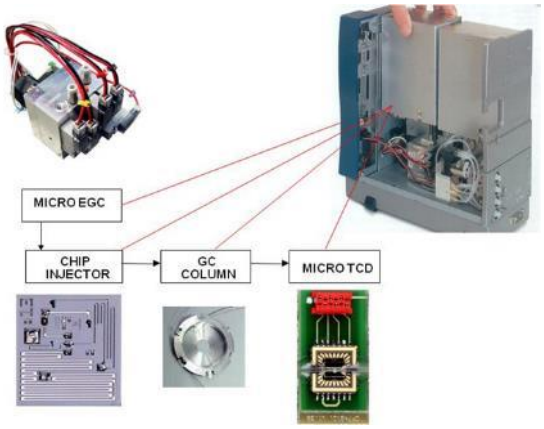
Specialized characterization facilities

- Gas studies facility (gas analysis)
  - DRD1 collaborators
  - EP-DT gas team for GC, O2, H2O, IR
- Chemistry and material laboratory
  - DRD1 collaborators (SEM, Pl, XRD, XRF, XPS, AFM, RAMAN, FTIR, laser, …)

O2, H2O, IR



GC/MS

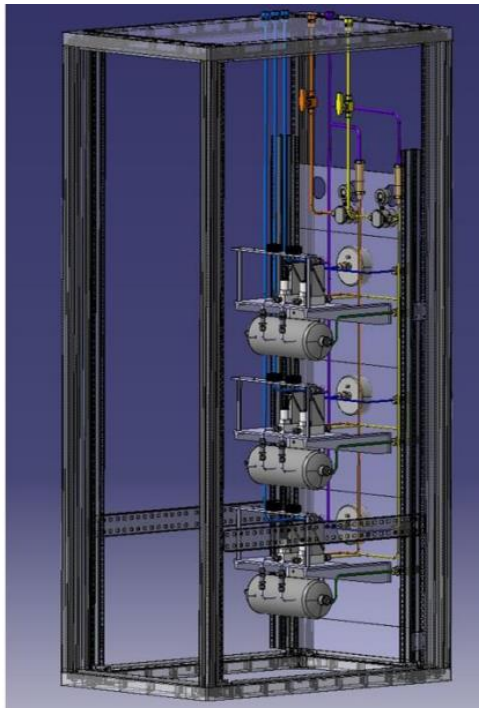


SEM

Common detector preparation Facilities

- Gas system workshop(s)
  - DRD1 collaboration
  - CERN EP-DT Gas team workshop

Construction of standardized gas system modules for gaseous detector: from lab size to large experiment



Potential Objectives and Tasks

Potential objectives and tasks

For draft session and to stimulate discussion

Preliminar: List of available facilities

Objective 1: Detector Laboratory

Objective 2: Test Beam

Objective 3: Irradiation Facility

Objective 4: Specialized Laboratory

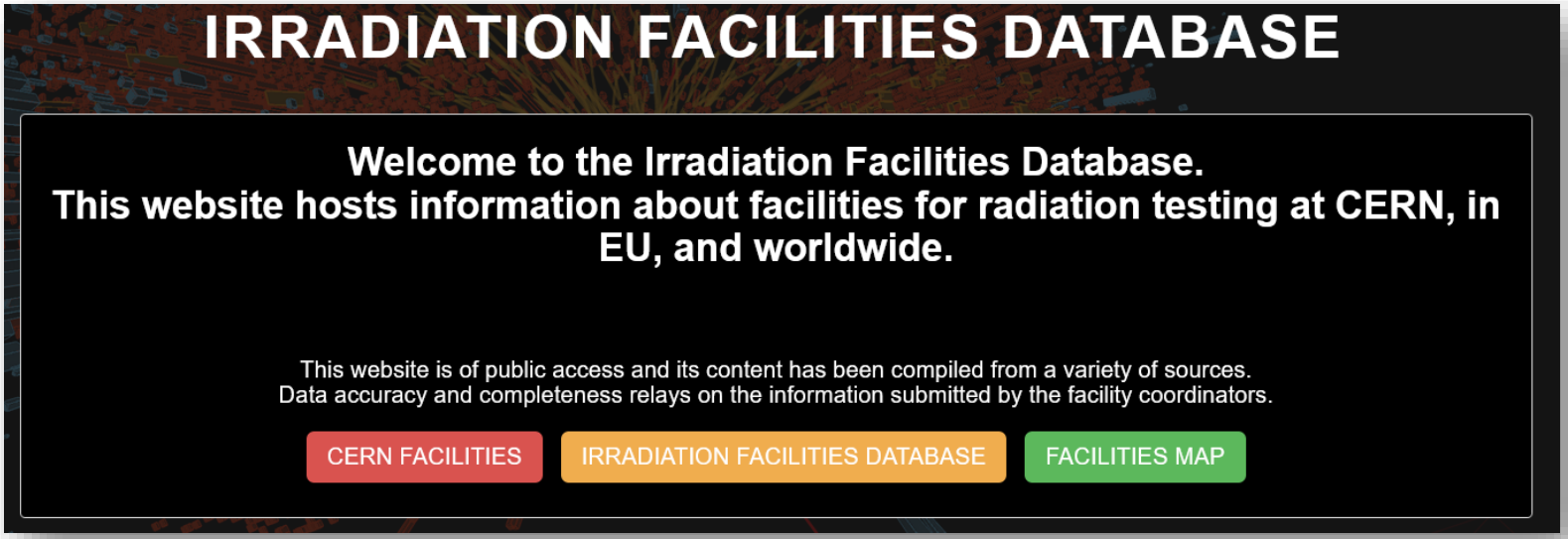
Objective 5: Instrumentation and software sharing

List of available facilities

List of available facilities (beyond DRD1)

We should avoid duplicating but **strengthening the existing**… put effort on providing inputs to existing database and push potential member of DRD1 to provide the info about their available facilities.

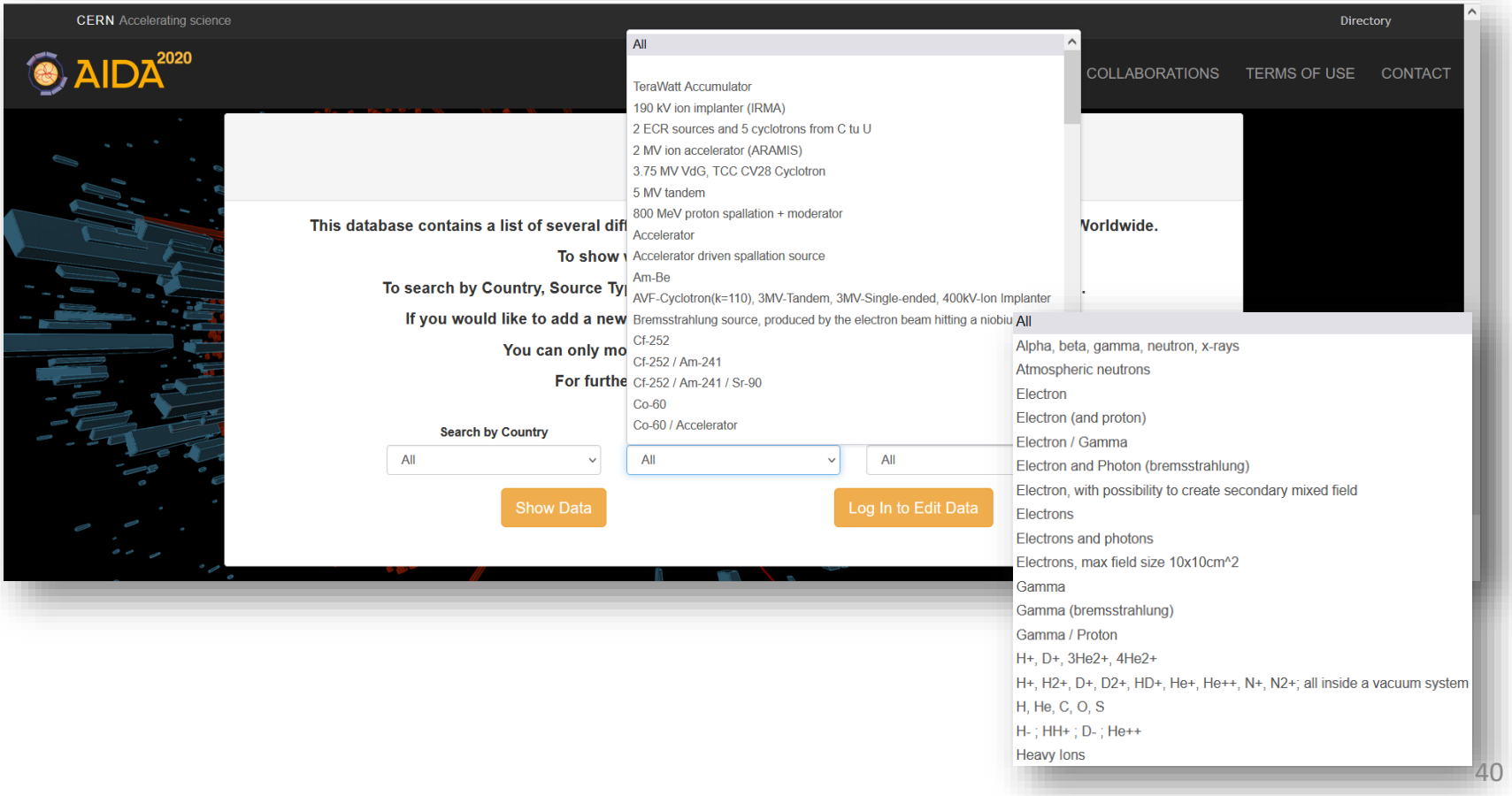
https://irradiation-facilities.web.cern.ch/



List of available facilities

Existing DATABASE (I)

https://irradiation-facilities.web.cern.ch/



Potential objectives and tasks

For draft session and to stimulate discussion

Objective 1: Detector Laboratory

- Task 1.1: Create a network of laboratories that can accept groups to perform detector characterization studies.
- Task 1.2: Establish characterizations techniques, setup and methods, supporting the development and dissemination of appropriate instrumentation.
- Task 1.3: Support laboratory handbook (e.g. GASEOUS DETECTORS HANDBOOK, F. Sauli, http://fabio.home.cern.ch/fabio/handbook.html)
- Task 1.4: Large Area Cosmic Stand

Objective 2: Test Beam

Objective 3: Irradiation Facility

Objective 4: Specialized Laboratory

Objective 5: Instrumentation and software sharing

Potential objectives and tasks

For draft session and to stimulate discussion

Objective 1: Detector Laboratory

Objective 2: Test Beam

- Task 2.1: Common test beam at the CERN/SPS
- Task 2.2: Tracking and Timing Telescopes based on different gaseous detector technologies
- Task 2.3: Common DAQ(s) and software

Objective 3: Irradiation Facility

Objective 4: Specialized Laboratory

Objective 5: Instrumentation and software sharing

Potential objectives and tasks

For draft session and to stimulate discussion

Objective 1: Detector Laboratory

Objective 2: Test Beam

Objective 3: Irradiation Facility

- Task 3.1: integrate existing current DRD1 facilities within tools that facilitate finding the most suitable for availability, time, particle, dose, detector requirement
- Task 3.2: develop common and easily maintainable electronics, gas systems and software
- Task 3.3: beam and cosmic triggers
- Task 3.4: are current facilities “strong” and “large” enough? Otherwise foresee interventions

Objective 4: Specialized Laboratory

Objective 5: Instrumentation and software sharing

Potential objectives and tasks

For draft session and to stimulate discussion

Objective 1: Detector Laboratory

Objective 2: Test Beam

Objective 3: Irradiation Facility

Objective 4: Specialized Laboratory

- Task 4.1: Outgassing laboratory and database (renewal, consolidation and maintenance)
- Task 4.2: Aging laboratory
- Task 4.3: Gas Analyzers

Objective 5: Instrumentation and software sharing

Potential objectives and tasks

For draft session and to stimulate discussion

Objective 1: Detector Laboratory

Objective 2: Test Beam

Objective 3: Irradiation Facility

Objective 4: Specialized Laboratory

Objective 5: Instrumentation and software sharing

- Task 5.1: Gas supply and monitoring units
- Task 5.2: Laboratory Instrumentation (amplifiers, floating pico-ammeters, P/T/H monitoring units,…) and HW/FW/SW repository
- Task 5.33: laboratory and test beam analysis software repository, documentation, TWIKI …