

Introduction

WG3 Gas and Material Studies

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DRD1 Collaboration Meeting at CERN

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Topics covered by the WG3: gas and material studies

*Address common key issues related to gas and materials
in the development of existing and future gaseous detectors*

- Gas**
 - Gas Properties (e.g. cross-section, chemical characterization, measurements)
 - Eco-gases studies
 - Light emission in gas
- Systems**
 - Gas recuperation and recirculation systems
 - Gas systems
 - Sealed detectors and systems
- Materials**
 - Resistive electrodes
 - Solid converters
 - Photocathodes (novel, aging, protection)
 - Novel materials (e.g. nanomaterials)
 - Material properties for detector and infrastructures
 - Light (low material budget) materials
- Long-term operation**
 - Precise mechanics
 - Ageing
 - Outgassing
 - Radiation hardness

Assets that the collaboration can support

It is fundamental to have common infrastructures and facilities, that would help in the execution of the projects in a more coherent and economical way as well as they would allow a better sharing of knowledge in the different fields

Gas properties

- simulation (support of software and training to the community): Garfield, Geant4, etc → WG4
- database common for the different technologies

Material studies and development

- Common tools/facilities to develop and prepare materials → WG6

Ageing studies

- facilities needed to perform ageing studies (for example GIF++) → WG7
- infrastructure necessary to run the test (for example trigger system, etc) → WG7

Outgassing, radiation hardness and material studies

- common facilities can be useful for all technologies → WG7

few examples

Common objectives for WG3

	Reference	Description	Common Objective	
Gas	D3.1.1	Gas properties: drift velocity, diffusion for e- and ions, gain measurements, light emission, attachment, etc.	Common gas properties database] Long-term operation] Systems
	D3.2.1	Characterisation of new eco-friendly gases: gas properties, cross-section, etc.	New data for the integration in Magboltz and Garfield++ (collaboration with WG4)	
Materials	D3.3.1	Longevity and ageing studies for different technologies	Report for a common approach	
	D3.3.2	Characterisation of material for the construction of detectors: material properties, compatibility, outgassing, etc.	Common construction material database	
Materials	D3.4.1	Development of gas recirculation and recuperation systems	New design and knowledge transfer	
	D3.5.1	Resistive material: characterisation of different materials	Common resistive material database and procedures	
	D3.6.1	Mechanics: compression, rigidity, machining precision, etc.	Common approach for the different technologies	

Table 13: WG3 - Common Objectives

We would like to start addressing some objectives in the coming months

- Important to know if some objectives are of major interest for WPs
- Please let us know if you would like to contribute on some objectives

WG3 communication channels and activities

Contact email: drd1-wg3-convenors@cern.ch

Mailing list: drd1-wg3@cern.ch

E-group link to subscribe: [DRD1-WG3](#)

Official discussion forum: <https://drd1-forum.web.cern.ch/>

WG3 kick-off meeting on April 2024: <https://indico.cern.ch/event/1394578/>

- 15 contributions
- A good way to know each other and the research activities on-going related to WG3

Organisation of topical meetings/workshops in the coming months

- Meetings on specific activities
- Online workshop to show laboratories, facilities, activities, etc.
- Please let us know if you would like to address a particular research topic!

Changes in WG3 conveners

- Barbara Alvarez Gonzalez and Davide Piccolo will leave as WG3 conveners due to other commitments
- Thanks a lot for their help and support in these months!

Today's contributions

14:00	Introduction 3162/1-K01, CERN	<i>Alessandra Pastore et al.</i> 14:00 - 14:10
	Set-ups for gas properties characterization 3162/1-K01, CERN	<i>Filomena Pinto dos Santos</i> 14:10 - 14:40
	Studies on absorption of methane with zeolite material 3162/1-K01, CERN	<i>Francesco Angiulli</i> 14:40 - 15:05
15:00	Irradiation effects on GEM detectors operated at RUN1 and RUN2 at the LHCb experiment 3162/1-K01, CERN	<i>Marco Poli Lener</i> 15:05 - 15:30
	Stability study of GEM detector and Performance study of a new RPC prototype 3162/1-K01, CERN	<i>Dr Saikat Biswas</i> 15:30 - 15:55
16:00	Coffee break 3162/1-K01, CERN	15:55 - 16:25
	Studies of RPCs with gallium-arsenic electrodes 3162/1-K01, CERN	<i>Alessandro Rocchi</i> 16:25 - 16:50
17:00	Raspberry PICO and IoT for RPC chamber slow control 3162/1-K01, CERN	<i>Laurent Mirabito</i> 16:50 - 17:15
	Search for Eco-friendly molecules producing .F and F- during the degradation in gaseous detectors by using quantum-... <i>Dr Jelena Jovanovic et al.</i>	