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ENSAR2

European Nuclear Science and Application Research 2

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# Deliverable D6.4 - GDS Topical Meeting

# "Rare-gas targets handling and recycling systems for GDS"

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Author: Thomas ROGER, GANIL, France
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| | Contributors: | Freddy Flavigny, IPN Orsay, France<br>Alain Gilibert, CEA/IRFU, France |
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*TABLE OF CONTENTS*



## *EXECUTIVE SUMMARY*

This document reports on the third topical meeting of the GDS (Gas-filled Detectors and Systems) Networking Activity of the ENSAR2 project. Deliverable D6.4 was to organise a topical meeting on the rare-gas targets handling and recycling systems for GDS (Month 36). In this report we report on the successful completion of this deliverable.

## *INTRODUCTION*

The aim of the GDS Networking Activity is to establish and coordinate a large group of research collaborations that are in the process of developing new capabilities with gas-filled, active-target detection systems for application in the field of nuclear physics. The GDS network exchanges information through various media and scientific events between physicists and engineers already working on these projects across Europe. It will assist and promote collaborations and personnel working on similar projects and will encourage the support and training of highly qualified personnel in this rapidly evolving field.

## *TOPICAL MEETING*

As part of the GDS networking activity, we have organised the third of four annual topical meetings. The third topical meeting was held from January 23 to January 25, 2019 at the "Institut de Physique Nucléaire d'Orsay (IPNO)"in France. The website for the meeting is available at: https://indico.in2p3.fr/event/18026/ .

The meeting was attended by a total of 41 participants from 20 different institutes and 8 different countries. The meeting programme consisted of short presentations from experts on active-targets detectors and gas detector systems, experts of electron transports in gases, and physics with deuterium, tritium and $^{3,4}$He targets. **Slides of presentations are available on the meeting website** and cover the following topics:

- Physics with deuterium, tritium and $^{3,4}$He
- Active-target and time-projection chambers: ongoing and forthcoming projects
- Gas properties and electron transport processes
- Solid, liquid and gaseous $D_2$, $T_2$ and $^{3,4}$He targets technologies
- Simulation for gas-filled detection systems

All speakers focused their talks on the main themes of the workshop, that is the techniques used to build $D_2$, $T_2$ and $^{3,4}$He targets, either solid, liquid or gaseous, the physics subjects that can be assessed using these targets, state-of-the-art gaseous detectors used in nuclear physics and the properties of those light elements in the gaseous phase.

All of these presentations triggered several discussions about the overlap and complementarity in Europe of many projects in nuclear physics and in particle physics. The need to coordinate such developments and to share the efforts emerged.

## *CONCLUSION*

The third of four annual meetings of the GDS collaboration was held at Institut de Physique Nucléaire d'Orsay (France) from January 23 to January 25, 2018. This topical meeting constitutes deliverable D6.4 of the ENSAR2 project and is the fourth deliverable of the GDS networking activity. The next GDS topical meeting D6.2 will be organised and should be held at the Katholieke Universiteit Leuven (Belgium).

## *ANNEXE: PROGRAM OF THE WORKSHOP*

| | | |
|---|---|---|
| | **Wednesday 23rd Januray 2019** | |
| 13h30 - 14h00 | Registration and Welcome | |
| 14h00 - 14h30 | W. Mittig | AT-TPC (to be specified) |
| 14h30 - 15h00 | J. Giovinazzo | ACTAR TPC: a new gas detector for nuclear physics |
| 15h00 - 15h30 | R. Raabe | SPECMAT (to be specified) |
| 15h30 - 16h00 | O. Kiselev | Classical ionization chamber as a heart of the nuclear and particle physics experiments |
| | Break(20min) | |
| 16h20 - 16h50 | G. Charles | Two recoil detectors for low energy particles |
| 16h50 - 17h20 | L. Naumann | Investigation of Gaseous Detectors with Laser Induced Electrons |
| 17h20 - 17h50 | H. Wilsenach | Pulse Shape Analysis with a Ultra-Low Background Frisch-Grid Ionisation Chamber |
| 17h50 - 18h20 | J. F. Ferrer | Solid targets containing high amonunt of 4He for Nuclear Physics Experiments |
| | **Thursday 24th Januray 2019** | |
| 9h00 - 9h30 | R. Venhoof | Lecture/Seminar |
| 9h30 - 10h00 | R. Venhoof | Lecture/Seminar |
| 10h00 - 10h30 | D. Suzuki | Transfer reaction experiments using deuterated isobutene gas in active targets |
| | Break (20 min) | |
| 10h50 - 11h20 | A. Gottardo | Cryogenic targets for transfer reactions: physics cases around shell closures |
| 11h20 - 11h50 | F. Hammache | Perspectives in nuclear astrophysics with He gas targets |
| 11h50 - 12h20 | J. Valiente | Transfer 3He(X,n)Y reactions for nuclear structure studies: the development of a new sputtered 3He target |
| | Lunch | |
| 14h00 - 14h30 | S. Salvador | GPU based transport simulations in gazeous detectors: Uroboros |
| 14h30 - 15h00 | K. Miki | Development of tritium target for the 3H(t,3He)3n experiment at RIBF |
| 15h00 - 15h30 | K. Schmidt | The JENSA windowless gas-jet target |
| 15h30 - 16h00 | S. Lukyanov | Gas Target for High-Resolution Magnetic Spectrometer "MAVR" |
| | Break(20min) | |
| 16h20 - 16h35 | H. Saugnac | 3,4He cryogenic target developed at IPNO |
| 16h35 - 17h05 | A. Matta | The NPTool framework: new opportunities for simulation and analysis of gazeous detector |
| 17h05 - 17h25 | E. Barlerin | Design of a gaseous beam monitor device using a GPU based simulation code |
| 19h00 | Workshop Dinner in Paris | |
| | **Friday 25th Januray 2019** | |
| 9h00 - 9h30 | R. Venhoof | Lecture/Seminar |
| 9h30 - 10h00 | R. Venhoof | Lecture/Seminar |
| 10h00 - 10h30 | K. Ivshin | Experimental setup for precision measurement of the capture rate of a muon by a deuteron (MuSun experiment) |
| | Break (20 min) | |
| 10h50 - 11h20 | L. Pollacco | PUMA - A TPC to detect $p^+$ & $p^-$ for Nuclear Physics experiments. |
| 11h20 - 11h50 | A. Vasilyev | Detector for precision measurement of the proton charge radius |
| 11h50 - 12h10 | S. Lukyanov | Fusion of 8B with Ar by the TexAT |
| 12h10 - 12h40 | T. Marchi | ACTAR Demonstrator test at LNS: an overview |
| | Lunch | |
| | | Open Discussion |
| | | END OF THE WORKSHOP |