

Introduction

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received 7 March 2023

This volume of *Il Nuovo Cimento* is the first published “White Book” for the Technology Park to be realized in the next years by Sogin together with the National Italian Repository for Radioactive Waste.

The papers here collected are based on presentations delivered at the “Research plans for the Technology Park annexed to the Italian National near-surface Repository for radioactive waste” held in Rome on 20-21 January 2023.

The main topics that were addressed in this workshop are:

- new technologies for radioactive waste treatment;
- monitoring radioactive waste;
- measurements of radioactivity for the environment;
- characterization of radioactive material;
- use and valorization of radioisotopes;
- radioactivity detection for industrial purposes (and NORM, Natural Occurring Radioactive Material).

To introduce the workshop it was pointed out that Sogin is strongly involved in research on the handling of radioactive waste and it actively participates in EU projects. The common goals of these EU projects are to organize networks, to exchange information on best practices and to conduct specific R&D research activities to advance and solve technological problems by going beyond the state-of-the art and by introducing new ideas and concepts.

The plan for a Technology Park, whose features were illustrated in the first talk, is mainly driven by the need to carry out research for the Repository but also by the hope for improving the quality of our life by exploiting competence on radioactivity. Moreover, the realization of a research center gives opportunities to the local companies and factories to produce cutting-edge technology.

At this workshop all speakers delivered very insightful talks that triggered many lively discussions. These talks provided updated overviews of the experience and perspectives from major institutions in Europe, USA and Japan involved in radioactive waste management. The news from the European Commissioners on the JRC center at Karlsruhe

and on the EURATOM research and training showed increasing commitment during the years. Concerning the possible use of radioisotopes in medicine and industry, the presentation of the experiences of INFN suggested ideas for projects that could fit into the research programme for the Technology Park. The technical improvements for monitoring radioactivity with gamma, neutrons and muons were the main focus of the talks from ENEA, INFN, CAEN, the Universities of Helsinki and of Naples. Interesting opportunities are also offered by new developments (at Universities of Florence and of Mainz) based on Laser techniques for the identification of ^{14}C and for the monitoring of radioactivity. On the measurement of radioactivity from the environment, the presentations from the Universities of Caserta and of Padua provided interesting hints.

The problems and critical issues on the characterization of nuclear materials were well discussed in several talks from the institutions ANL (USA) SRLN (USA), SANDIA (USA), NNSA (USA), SCK-CEN (Belgium), NNL (UK), RATEN (Romania) and JAEA (Japan). All these talks and those on the radioactivity detection for industrial purposes from ENI, ISPRA and ISIN were particularly enlightening.

It is clear from the discussions that took place at this workshop that education and training in the nuclear sector need to attract much more attention. This was well underlined in the presentation of the Consorzio Interuniversitario per la Ricerca Tecnologica Nucleare. It is encouraging to learn that there is presently an increasing trend in the number of students interested in nuclear technologies.

In summary, this successful workshop was very informative and stimulating for the future research programme at the Technology Park. These intense two days were possible thanks to the dedicated work of the Sogin team, the very good presentations of the speakers, the excellent inputs from our advisory board, the very good engagement of the session chairs and the very active participation of all the attendees. Our warm thanks to all!

We expect this White Book to be a reference for us in the next years and to lead the way for collaborations and further initiatives for our Technology Park.