



**IAEA**

International Atomic Energy Agency

*Atoms for Peace and Development*

# **Second Training Workshop on the Safe Operation and Applications of Neutron Generators**

**IAEA Nuclear Science and Instrumentation Laboratory  
Seibersdorf, Austria**

**6-17 November 2023**

**Ref. No.: EVT2205741**

## **Information Sheet**

### **Introduction**

The use of various neutron sources, either accelerator- or research reactor-based, enhance innovation and socioeconomic development in a variety of fields such as health, materials research, agriculture, cultural heritage, environment, safety and security and many others. Compact neutron generators are electrically controlled neutron sources of low-medium intensity that are an attractive alternative to low power research reactors or isotopic neutron sources (e.g. Cf-252, Am/Be, Pu/Be) which are not free from security risks and radioactive waste management issues. Having been used for decades in oil and mining industries, for exploration and on-line analysis, neutron generator applications have expanded. These include neutron radiography, complementary to X-ray radiography; neutron activation analysis, a highly sensitive analytical technique; radiotracer production for industrial applications; as well as investigations related to security and safeguard applications. Due to their capabilities and transportability, which allows on-field utilization, neutron generators play a major role in solving problems of modern society related to the control of industrial processes, the monitoring of environmental pollution, climate change, water and air quality, to forensics, cultural heritage, agriculture, security and safeguard.

In this context, applications of neutrons are one of the thematic areas, where the IAEA supports its Member States in strengthening their capabilities to adopt and benefit from use of diverse neutron sources. The IAEA Nuclear Science and Instrumentation Laboratory (NSIL) has established the

Nuclear Science Facility (NSF) based on one Deuterium-Deuterium and the two Deuterium-Tritium sealed tube neutron generators, providing neutrons in the energy range of fission (2.5 MeV) and fusion (14 MeV) reactors at intensities of  $5 \times 10^6$  to  $5 \times 10^8$  n/s over  $4\pi$ . Based on the experiences from the first training held in 2022, NSF is further developing training capabilities.

## **Objectives**

The purpose of the event is to train the participants in the safe operation and use of neutron generators, including demonstration of their applications and related modelling tools, through lectures and practical hands-on exercises. Specifically, the training workshop will include the following topics:

- Neutron production using neutron generators
- Neutron detection principles
- Neutron spectrometry
- Neutron radiography
- Introduction to neutron activation analysis (NAA)
- Introduction to delayed neutron counting (DNC)
- Safety and radiation protection considerations operating neutron generators

## **Target Audience**

This training workshop is intended for newcomers to the field of operating and using neutron sources of low-medium intensity, either already established at their organizations or in the planning stages. Representatives of regulatory bodies or radiation protection agencies, involved in oversight and regulation of similar facilities, might also find this event beneficial.

## **Working Language(s)**

English.

## **Participation and Registration**

The hands-on training will be limited to 10 trainees due to organizational and practical constraints. All persons wishing to participate in the event have to be designated by an IAEA Member State or should be members of organizations that have been invited to attend.

In order to be designated by an IAEA Member State, participants are requested to send the **Participation Form (Form A)** to their competent national authority (e.g. Ministry of Foreign Affairs, Permanent Mission to the IAEA or National Atomic Energy Authority) for onward transmission to the IAEA by **10 August 2023**. Participants who are members of an organization invited to attend are requested to send the **Participation Form (Form A)** through their organization to the IAEA by above deadline.

**In addition to the Form A, applicants are requested to send a short CV with a brief justification statement why this training would be beneficial for their organization and their professional development.**

Selected participants will be informed in due course on the procedures to be followed with regard to administrative and financial matters.

Please note that the IAEA is in a transition phase to manage the entire registration process for all regular programme events electronically through the new InTouch+ (<https://intouchplus.iaea.org>) facility, which is the improved and expanded successor to the InTouch platform that has been used in recent years for the IAEA's technical cooperation events. Through InTouch+, prospective participants will be able to apply for events and submit all required documents online. National authorities will be able to use InTouch+ to review and approve these applications. Interested parties that would like to use this new facility should write to: [InTouchPlus.Contact-Point@iaea.org](mailto:InTouchPlus.Contact-Point@iaea.org).

## **Expenditures and Grants**

No registration fee is charged to participants.

The IAEA is generally not in a position to bear the travel and other costs of participants in the event. The IAEA has, however, limited funds at its disposal to help meet the cost of attendance of certain participants. Upon specific request, such assistance may be offered to normally one participant per country, provided that, in the IAEA's view, the participant will make an important contribution to the event.

The application for financial support should be made using the **Grant Application Form (Form C)** which has to be stamped, signed and submitted by the competent national authority to the IAEA together with the **Participation Form (Form A)** by **10 August 2023**.

## **Visas**

Participants who require a visa to enter Austria should submit the necessary application as soon as possible to the nearest diplomatic or consular representative of Austria.

## **Organization**

## **Scientific Secretary**

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Subsequent correspondence on scientific matters should be sent to the Scientific Secretary/Secretaries and correspondence on other matters related to the event to the Administrative Secretary.