

Overview of Nuclear Data Production System: The Neutron Experimental System at RAON

Thursday, 20 November 2025 13:00 (40 minutes)

A neutron experimental system, called Nuclear Data Production System (NDPS) [1,2], has been constructed at RAON (Rare Isotope Accelerator complex for ON-line experiments) in Republic of Korea. It is designed to produce both white and mono-energetic neutrons, utilizing ion beams and proton beams with thick graphite and thin lithium targets, respectively. Neutrons are generated in the target room and guided to the TOF room via a 4-meter-long neutron collimator composed of iron and 5% borated polyethylene. The neutron flight path from the production target to the detectors can be adjusted from 5 to 50 meters, depending on the experimental requirements. At the downstream end of the experimental room, a neutron beam dump is installed to absorb neutrons and reduce scattered backgrounds.

In 2024, the first beam test of NDPS was conducted using 16 MeV/u $^{40}\text{Ar}^{18+}$ ion beams to generate neutrons. The emitted neutrons are measured using EJ-301 liquid scintillators and activation foils to evaluate the neutron energy spectrum. This presentation will provide an overview of NDPS, along with its current status.

References

- [1] C. Ham et al., “Overview of nuclear data production system at RAON”, Nucl. Instrum. Methods Phys. Res. B 541 (2023) 363-365.
- [2] C. Ham et al., “Status of nuclear data production system at RAON”, J. Korean Phys. Soc. 87 (2025) 662-669.
- [3] D. Kwak et al., “Development and commissioning of the pre-bunching system at RAON”, Nucl. Instrum. Methods Phys. Res. A 1080 (2025) 170805.

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