Contribution ID: **6**   Type: **not specified**

Present and future of JENDL-5/JENDL-5 の現在と将来

Wednesday, 19 November 2025 13:00 (40 minutes)

The latest version of the Japanese Evaluated Nuclear Data Library, JENDL-5, was released at the end of 2021. JENDL-5 integrated the nuclear data released as the general-purpose and special-purpose files to meet the growing needs in various fields of nuclear energy and radiation applications [1]. The library consists of 8 nuclear related sub-libraries and 3 atomic related ones. While the atomic related data were adopted from ENDF/B-VIII.0, a large part of the nuclear related data originates from the JENDL libraries. So far, the fission product yields and thermal scattering law in JENDL were adopted from other libraries such as ENDF and JEFF, JENDL-5 includes the originally evaluated ones for those. The neutron reaction data, the most important data in the nuclear data library, was updated and increased in the wide range of nuclides from light to heavy ones. The number of nuclides increased to nearly double the previous version JENDL-4.0, and the incident neutron energy range was extended from 20 MeV to 200 MeV for many nuclides. In the viewpoints of the performance of reactor calculations, the benchmark results for those showed significant improvements from ones of the JENDL-4.0 especially for plutonium-related cores.

For the next version of JENDL-5, the uncertainty of the evaluated data, i.e. covariance, is focused on for revision due to the lack of those data for many nuclides. They are important to evaluate the uncertainties due to the nuclear data for the neutronics calculations especially for new types of nuclear reactor systems. In addition, new measurements of nuclear reactions and thermal neutron scattering with ANNRI and other facilities in J-PARC are in progress. They will be considered for updates. Other efforts about muon nuclear data and nuclear three-body forces have been launched. They would progress the data of JENDL.

References

[1] O. Iwamoto, N. Iwamoto, S. Kunieda, \textit{et al}., ""Japanese evaluated nuclear data library version 5: JENDL-5", J. Nucl. Sci. Technol. 60 (1), (2023), pp. 1-60.

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Session Classification: Opening Plenary / オープニングプレナリー