Workshop on Muon Nuclear Data

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A workshop on Muon Nuclear Data was held in the afternoon on December 14th, 2023, at the RIBF conference room as an on-site venue, combined with online connections using the Zoom web conference system. The workshop was jointly organized by the Nuclear Transmutation Research Group at RIKEN Nishina Center and the Investigation Committee on Nuclear Data (Sigma Committee) at the Atomic Energy Society of Japan. A total of 49 researchers registered for the workshop, and approximately 20 persons participated on-site.

The importance of muon-induced nuclear reaction has garnered attention in many fields of the natural sciences and applications, such as nuclear physics, nuclear transmutation for nuclear waste, muon-induced radioactive isotope production for medical use, radiation safety in the muon facilities, cosmic muon-induced soft error in modern semiconductor devices, and cosmogenic production of radioactive nuclides for geological studies. Despite the demand, nuclear data of the muon-induced reaction has rarely been investigated thus far. Such nuclear data has become available owing to the recent advances in low-energy muon facilities, such as the RIKEN-RAL muon facility,[2] the Muse at J-PARC MLF,[3] and the MuSIC at RCNP.[4] The workshop aims to share the current status of experimental and theoretical investigations on muon nuclear data and discuss developing a new database for muon-induced nuclear reactions.

The workshop comprised 6 invited talks, followed by discussions about the future perspectives among the participants. The invited talks were:

- M. Niikura (RIKEN) on overview of the muon nuclear data,
- S. Kawase (Kyushu University) on measurement of charged particles from the muon capture reaction,
- Y. Yamaguchi (Japan Atomic Energy Agency) on radiation safety at J-PARC MLF and measurement of radioactive isotope production by the muon capture reaction,
- S. Abe (Japan Atomic Energy Agency) on muon interaction in the particle and heavy ion transport code system (PHITS),
- Y. Nakajima (University of Tokyo) on nuclear physics experiment for an understanding of neutrino induced nuclear reaction, and
- F. Minato (Kyushu University) on theoretical investigation for the particle emissions and their energy distributions from the muon capture reaction.

To encourage the discussion in an informal atmosphere, each talk was allotted a sufficient time of more than 30 min, including questions and discussions during the presentation.

We are now planning to organize the second workshop in January 2025.

References

1) https://indico2.riken.jp/event/4656/.
2) T. Matsuzaki *et al.*, Nucl. Instrum. Methods Phys. Res. A **465**, 365 (2001).
3) Y. Miyake *et al.*, Phys. Procedia **30**, 46 (2012).
4) S. Cook *et al.*, J. Phys. Conf. Ser. **408**, 012079 (2013).

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