

## NUCLEAR DATA FOR ASTROPHYSICAL NUCLEOSYNTHESIS: A JAPANESE + LANL ACTIVITY

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Nuclear reactions, especially the neutron-induced reactions, play essentially important roles both in nuclear energy applications and astrophysical nucleosynthesis. In fact, about 99 % of elements heavier than the iron-nickel group in the solar system were synthesized by two successive neutron capture reaction chains, namely the s- and r-processes.

In the past, the nuclear-data and astrophysical communities have engaged in constructing databases on nuclear structure, reaction, and decay rates independently. There are many common features in the activities of these two communities, but both approaches have specific strengths and drawbacks that can be compensated by each other.

Here, we would like to present a status of a loosely-bound Japanese + LANL activity to generate a new database for astrophysical nucleosynthesis. As a new comer, we are currently putting emphasis on nuclear reaction rates for neutron-induced reactions (mostly by phenomenological methods), nuclear mass and  $\beta$ -decay rates covering some thousands nuclei needed for r-process calculations. However, special attention is also paid for, e.g., theoretical treatment of charged-particle reactions in light nuclei, properties of nuclei far off  $\beta$ -stability and high-density nuclear/hadron matter that determine the physical conditions of BBN and r-process nucleosynthesis sites.

The main contents of our activities are categorized as follows:

- Nuclear mass and related data (Waseda/Riken/JAERI)
- $\alpha$ - and  $\beta$ -decay rates (Waseda/Riken/JAERI)
- Fission barrier and fission half lives (Waseda/Riken/JAERI)
- Neutron capture cross section calculations (LANL/JAERI)
- Fission yield calculations (Konan/JAERI)
- Reaction rates involving 3- and 4-clusters (JAERI/TUS/Kyushu)
- Measurements of important reaction rates (JAERI/TIT)
- Properties of supernova and neutron-star matter (JAERI/Kyoto)
- Astrophysical applications, interpretations and feedback to nuclear data (NAO/JAERI)

Summaries of these activities and future scopes will be presented at the conference.

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