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Special Issue on
Accelerator-Driven System Benchmarks at Kyoto University Critical Assembly (ADS Benchmarks at KUCA)

Call for Papers

The accelerator-driven system (ADS) had been proposed for producing energy and transmuting minor actinides and long-lived fission products. ADS has attracted worldwide attention in recent years because of its superior safety characteristics and potential for burning plutonium and nuclear waste. An outstanding advantage of its use is the anticipated absence of reactivity accidents, provided sufficient subcriticality is ensured. At the Institute for Integrated Radiation and Nuclear Science (KURNS), Kyoto University (former the Research Reactor Institute, Kyoto University: KURRI), a series of experiments on ADS was launched in fiscal year 2003 at the Kyoto University Critical Assembly (KUCA). Also, the fixed-field alternating gradient (FFAG) accelerator was attached to the KUCA facility in March 2008, and the high-energy neutrons generated by the interaction of 100 MeV protons with tungsten target was injected into KUCA on March 2009. The experimental studies on ADS are being conducted for nuclear transmutation analyses with the combined use of KUCA and the FFAG accelerator. Furthermore, ADS experiments with 100 MeV protons obtained from the FFAG accelerator have been carried out to investigate the neutron characteristics of ADS, and the static and kinetic parameters were accurately analyzed through both the measurements and the Monte Carlo simulations of reactor physics parameters, including the reaction rates, the neutron spectrum, the subcritical multiplication factor, the neutron decay constants and the subcriticality. This special issue aims at conducting experimental analyses for the ADS benchmarks at KUCA on the most recent advances in the development of computational methods. Potential topics include, but are not limited to, with the use of "ADS Experimental Benchmark Data at KUCA" and "References," as follows:

- Deterministic and stochastic analyses methods
- On-line monitoring techniques of subcriticality
- Uncertainty of methodology for subcriticality
- Energy and spatial correction factors for kinetic parameters
- Development of reactor analyses codes for ADS
- Modeling of spallation reactions
- Discussion and comparison of different properties of critical and subcritical cores
- Sensitivity and uncertainty of Pb and Bi isotopes
- Nuclear data analyses

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ADS Experimental Benchmark Data at KUCA

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3. C. H. Pyeon, "Experimental Benchmarks of Neutronics on Solid Pb-Bi in Accelerator-Driven System with 100 MeV Protons at Kyoto University Critical Assembly," KURRI-TR-447 (2017). http://www.rri.kyoto-u.ac.jp/PUB/report/03_tr/img/KUCA_ADS-CRP2016.pdf
4. C. H. Pyeon, "Experimental Benchmarks of Neutron Characteritics on Uranium-Lead Zoned Core in Accelerator-Driven System at Kyoto University Critical Assembly," KURNS-EKR-001 (2018). http://www.rri.kyoto-u.ac.jp/PUB/report/09_kurns/temp/kurns-ekr-001.pdf
5. Experimental Benchmarks of Lead and Bismuth Sample Reactivity Worth at Kyoto University Critical Assembly [to be determined]

References

ADS with DT accelerator (14 MeV neutrons)

- Benchmark 1 (Neutron guide core with 14 MeV neutrons)

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- Benchmark 4 (U-Pb core with 14 MeV neutrons)

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ADS with FFAG accelerator (100 MeV protons)

- ADS with 100 MeV protons (General)

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- Benchmark 2 (Thorium-loaded ADS with 14 MeV neutrons and 100 MeV protons)

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- Benchmark 3 (Pb-Bi target and zoned core with 100 MeV protons)

[24] C. H. Pyeon, H. Nakano, M. Yamanaka, *et al.*, "Neutron Characteristics of Solid Targets in Accelerator-Driven System with 100 MeV Protons at Kyoto University Critical Assembly," *Nucl. Technol.*, **192**, 181 (2015).

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- Benchmark 5 (Pb and Bi sample reactivity worth)

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