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Neutronics Experimental Verification for ADS with China Lead-based Zero Power Reactor

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Abstract:
An Accelerator Driven System (ADS) project for nuclear waste transmutation has been launched by Chinese Academy of Sciences (CAS) since 2011. China LEAd-based Reactor (CLEAR) was selected as the reference reactor for the CAS ADS project and was designed and developed by Institute of Nuclear Energy Safety Technology (INEST), CAS. According to the research and development roadmap of CLEAR, a 10MWth lead-bismuth cooled pool-type research reactor named CLEAR-I coupled with a proton accelerator will be constructed at the first stage.
In order to verify the nuclear physics performances and the coupling techniques for the ADS system, a multifunctional lead-based zero power reactor (CLEAR-0) has been built. A brief introduction on the design objective, experiment functions and system description for CLEAR-0 is given in this paper. The recent R&D progress on core design and coupling system is also presented. The first stage of CLEAR-0 is scheduled to be finished for construction and will be commissioning in the end of 2016, series of core characteristic experiments will be carried out in CLEAR-0. The testing data will be used to validate the calculation method, program and database used in the nuclear design, and also to support the safety analysis and license application for CLEAR-I.
Keywords: Accelerator Driven System (ADS); Zero Power Reactor; China Lead-based Research Reactor; CLEAR-0

Country/Int. Organization

China/Institute of Nuclear Energy Safety Technology, CAS ·FDS Team

Primary author: Prof. WU, qingsheng (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team)

Co-authors: Prof. LIU, chao (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team); Dr CHEN, jianwei (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team); Dr CHEN, size (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team); Prof. WU, yican (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team)

Presenter: Prof. WU, qingsheng (Institute of Nuclear Energy Safety Technology, CAS ·FDS Team)

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