8. PRISPEVEK

Validation of MCNP6 model of the Jordan Research and Training Reactor (JRTR) for calculations of neutronic parameters

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Jordan Research and Training Reactor (JRTR) is a multi-purpose open-tank pool-type reactor with nominal power of 5 MW currently under commissioning. The core consists of 18 fuel assemblies and uses plate type fuel of low enriched uranium of 19.75% ^{235}U enrichment. The reactor has several irradiation holes, fifteen in-core, sixteen ex-core, four beam ports, and thermal column. The reactor will be utilized for the purpose of training and education, radioisotope production, samples irradiation, and beam ports applications. For better utilization of irradiation and beam applications the neutronic characteristics, mainly the reactor flux map and the neutron energy spectrum in the irradiation positions, should be determined before irradiating targets in the reactor. Additionally, the reactivity changes due to insertion and extraction of the samples and safe operation of reactor must be analysed and evaluated to meet the conditions of safe operation. For this purpose, a detailed model of the JRTR core was prepared using MCNP 6 to study these important parameters. Several cases were considered to determine the flux map and spectrum for reference and operational cores. This methodology should govern the future of JRTR for irradiations, it will help to investigate the reactor thoroughly and to fix the operation parameters before going into a systematic utilization scheme with the required safety confidence.