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The results of the NSC KIPT subcritical assembly neutron source facility physical start up

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Subcritical Assembly Neutron Source facility of the National Science Center "Kharkiv Institute of Physics & Technology"(NSC KIPT), Kharkov, Ukraine is Accelerator Driven System with tungsten or uranium neutron generating target and 100MeV/100kW electron linear accelerator as a driver.
The facility physical start up was started in the middle of 2020 fnd completed in August 2022. The program of the facility physical start-up supposes to operate with tungsten neutron generating target and to carry out stepwise fuel element loadings with neutron multiplication factor and reactivity measurements at the end of each loading step. During the physical start up it was supposed to load 38 fuel elements in several loading steps. 200 W electron beam was used for neutron multiplication factor and reactivity measurements.
After loading of 37 fuel assemblies the measured value of neutron multiplication factor was 0.941. Because of nuclear safety reasons it was decided to complete the facility physical start up and make some clarifying simulation for 38 loaded in the core fuel assemblies taking into account tolerances for fuel mass, geometry and nuclei data uncertainty to be sure that the value of multiplication factor will be not higher than 0.96.
During the the facility start up the results of the reactivity and neutron multiplication factor measurements were in a good agreement with results of Monte-Carlo simulations for NSC KIPT SCA Neutron Source facility.

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Footnotes

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