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Radiation Field Calculations Around the Spallation Target and the Reactor Core for the MYRRHA ADS Design

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The MYRRHA facility at SCK-CEN in Mol (Belgium), which should enter the construction phase in 2015, aims to demonstrate efficient transmutation of high level waste and associated Accelerator-Driven Systems (ADS) technology. The system is based on a lead-bismuth eutectic (LBE) cooled reactor, working both in critical and in sub-critical operation modes. The neutrons needed to sustain fission in the sub-critical mode are produced via spallation processes by a 600 MeV, <4 mA proton beam, which is provided by a linear accelerator and hits a LBE spallation target located inside the reactor core. In order to assess the main shielding problems, a method based on the combined use of the two Monte Carlo codes MCNPX and FLUKA has been developed, with the goal to perform detailed analyses of both the radiation fields due to the system in operation, and the coupled residual radiation due to the activated materials. The results of this simulation work are presented, with the implications on the design solutions.

Summary

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