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The EURISOL facility - radiation protection and radiation shielding issues - A review

The EUROpean Isotope Separation On-Line Radioactive Ion Beam (EURISOL) is the next-generation facility for the production of Radioactive Ion Beams (RIBs) using the ISOL method in the European Union.

To produce the RIBs in the EURISOL facility a proton beam of 1 GeV (4 MW power) impinges on a converter, generating, through spallation reactions, intense neutron fluxes with peak values of the order of 5×10^{15} neutrons/cm²/s.

The design of the EURISOL facility and associated infrastructures as well as instrumentation involves the consideration of scientific, technological and engineering leading-edge and multidisciplinary topics due to the exposure of the system components to extremely high neutrons fluxes and doses. Therefore, the system needs to be carefully designed from the radiological protection and safety point of view, taking into account the thermal and mechanical properties of the structural materials and the requirements for handling and maintenance of the critical components (targets), during operation and after shutdown. This paper provides a review of the neutron fluxes and radiation doses measured in current generation facilities and presents an estimation of the fluxes and doses foreseen for the EURISOL facility.

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