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Study and implementation of the shield around a beam dump of a new experimental transport beam line at LNS

The “Laboratori Nazionali del Sud” (LNS) of Italian National Institute for Nuclear Physics (INFN) are equipped with two accelerators, a Van de Graaff Tandem and a K800 Superconducting Cyclotron. The accelerators produced ions with atomic mass from 1 to 238 amu and energy until 100 MeV/amu.

Following an upgrade of the beam currents up to 10^{14} pps for some radionuclides from C-12 to Ne-20, a shield around the final beam dump of a new beamline equipped at the LNS, has been studied and implemented.

A study of materials to be used for the realization of the shield both in terms of secondary neutrons produced by the switching off of the primary beam on the beam dump and in terms of shielding power has been done. Furthermore, once the material for the realization of the beam dump shielding has been chosen, a study relating to the residual activation has been carried out.

The choice of the best materials to use has been carried out using Monte Carlo FLUKA simulations and other calculation programs.

The procedures for the choice of the materials and the Monte Carlo simulations are described.

Scientific Topic 1

Scientific Topic 2

Scientific Topic 3

Scientific Topic 4

Shielding and dosimetry

Scientific Topic 5

Induced radioactivity and decommissioning

Scientific Topic 6

Radiation damage to materials

Scientific Topic 7

Scientific Topic 8

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