Contribution ID: **21** Type: **not specified**

Muon and neutron background measurements in the shallow-underground laboratory Felsenkeller

The new shallow-underground laboratory Felsenkeller (140\,m.w.e.) in Dresden, Germany hosts a new 5\,MV underground ion accelerator in tunnels VIII and IX, as well as a low-radioactivity counting facility. For the laboratory commissioning both the muon and neutron background were measured and matched by Monte Carlo simulations.

A portable muon detector based on the close cathode chamber design was used to determine the angular distribution intensity of the muons. At four positions in Felsenkeller tunnels VIII and IX and four in tunnel IV a muon flux map of the upper hemisphere was compiled with 0.9° angular resolution.

The data are matched by two different simulations taking into account the known geodetic features of the terrain: First, simply by determining the cutoff energy using the projected slant depth in rock and the known muon energy spectrum, and second, in a GEANT4 simulation.

The ambient neutron flux and spectrum were measured with two sets of moderated ^{3}He counters, each including a lead-lined moderator to address neutrons up to 300\,MeV energy. The data show that at a given depth, both the flux and the spectrum vary by up to a factor of 7 depending on local shielding conditions.

The neutron flux is matched by FLUKA Monte Carlo simulations, based on the known muon flux and the known composition of the wall, with excellent agreement. Also, in the 10-300 MeV neutron energy region that is almost exclusively determined by muon-induced neutrons, satisfactory agreement between data and simulation was reached.

Authors: Mr LUDWIG, Felix (Helmholtz-Zentrum Dresden-Rossendorf); Mr GRIEGER, Marcel (Helmholtz-Zentrum Dresden-Rossendorf); Mr HENSEL, Thomas (Helmholtz-Zentrum Dresden-Rossendorf)

Presenter: Mr LUDWIG, Felix (Helmholtz-Zentrum Dresden-Rossendorf)