Muon flux measurement in the shallow-underground laboratory Felsenkeller

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Muons, which are produced by cosmic rays in the atmosphere, are highly penetrating and are only mitigated by the roughly 50 m of rock above the shallow underground laboratory Felsenkeller in Dresden, Germany.
In order to determine the precise flux and angular distribution amount of muons reaching the tunnels of Felsenkeller, a portable muon detector developed and built by the REGARD group [1] was employed.
Data have been taken at four positions in Felsenkeller tunnels VIII and IX, where the new 5 MV accelerator will be hosted, and in addition for reference at three positions in Felsenkeller tunnel IV. At each position, seven different orientations of the detector were used to compile a map of the upper hemisphere.
The measured muon flux data are compared with a GEANT4 simulation using the known shape and density of the local rock cover.

References

[1] D. Varga, G. Kiss, G. Hamar, and G. Bencédi, Nucl. Inst. Meth. A **698**, 11 (2013).