



Contribution ID: 75

Type: **not specified**

The ESSnuSB large water Cherenkov neutrino detector project in Zinkgruvan

Tuesday, 22 October 2024 15:45 (15 minutes)

The ESSnuSB high intensity neutrino beam will be directed towards a 540 000 m³ water Cherenkov detector situated 1000 underground, near the location of the second neutrino oscillation maximum, in the Zinkgruvan mine 360 km north of the ESS site in Lund in Sweden. The design of the large underground caverns to house the detector will require core-drillings to be made to measure the pressure and strength of the rock at the planned detector location. A presentation will be made of the planned rock engineering design of the neutrino Cherenkov detector caverns and service galleries as well as of the design of the photodetector system, of the water purification system, of the system to mix in Gadolinium and of the detector calibration system, part of which is currently being tested in the Water Cherenkov Test Experiment (WCTE) at CERN, and the use, concurrently with neutrino data collection, of the large detector for muon tomography of wide rock volumes around the mine and the use, after decommissioning of the Cherenkov detector, of the detector caverns for pumped water energy storage. This design work is the object of an infrastructure development (INFRADEV) project UnuDET to be submitted to EU.

Summary

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Session Classification: Session 08