**The Neutron Multiplicity Meter** (NMM) in the Soudan cavern is a 4-ton gadolinium-doped water Cerenkov detector situated on top of a 40 cm thick lead target \cite{henningsyeomans}. The lead target acts as a fast neutron converter, allowing 100 MeV-scale neutrons to be detected through $(n,kn)$ reactions induced in the lead. The secondary neutrons, with MeV-scale energies, are then thermalized in the water volume and captured on gadolinium nuclei. De-excitation of the gadolinium results in a shower of gamma rays summing to approximately 8 MeV, detected by the Cerenkov light emitted from subsequent Compton-scattered electrons in the water volume. The detected neutron multiplicity is roughly correlated with the incident neutron energy, and a multiplicity threshold of 5 corresponds to approximately 40 MeV. This is the only known measurement of muon-induced neutron production anti-coincident with a muon traversing the detector volume at 2 km.w.e. A fully calibrated Geant4 simulation \cite{sweanythesis} is used to estimate the accuracy of the predictions presented in \cite{meiandhime}. The NMM collaboration \cite{nmmcolab} is currently working to better understand non-neutron backgrounds and incorporate greater statistics into the data analysis before publishing a definitive comparison of their observed event rate to the simulated fast-neutron flux, where the spectrum of simulated neutrons entering the Soudan cavern is modeled parametrically according to \cite{meiandhime}. Additionally, simulations of single muons following \cite{music/musun} within a realistic cavern geometry are being performed, providing a cross check to the \cite{meiandhime} parameterization and allowing a more robust validation of Geant4 and Fluka modeling.

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