

Background Studies for Deep underground Experiments

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Underground cavities are the location of choice for low background experiments. Nevertheless, the hadronic showers created by muons or neutrinos, which penetrate deep into the earth, cause radiation, even inside the deepest cavity. The showers do not have to originate inside the cavity. The minimum distance from the shower vertex, up to which muons have to be considered as “dangerous”, is investigated. Moreover, the overall shower behavior and its single components, especially the neutral component, are studied.

The fluxes from hadronic showers from muons as expected deep underground are presented. Furthermore, in order to study neutron interactions in Germanium crystals, the neutron flux arising from the latter study is used to probe such interactions. Each Germanium isotope is investigated separately. The resulting energy spectra are presented, especially in the region of interest for direct dark matter search (sub-keV) and in the region of interest for neutrinoless double beta decay search (around 2 MeV for Ge-76). In addition, shielding options against are discussed.

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