



Contribution ID: 1365

Type: **Poster contribution**

Geant4 simulations of multi-neutron events observed underground.

Tuesday, 4 August 2015 16:00 (1 hour)

In low background underground laboratories neutrons create important background in experiments searching for very rare events. These neutrons might origin from incoherent radioactive decays or large number of neutrons might be produced in coherent way in muon induced cascades. Neutrons produced in muon cascades might have significantly larger energies than those from radioactive sources. We had searched for multi-neutron events in our neutron background measurements made in the Gran Sasso Underground Laboratory (Italy), Slanic Salt Mine laboratory of IFIN-HH (Romania) and in our underground laboratory of NCBJ in Łódź. We have used the same tray of helium counters placed in polyethylene moderator. Neutron number distributions and rates depend on the depth of the underground site. The maximum number of neutrons observed within 2 milliseconds was 8 in Slanic and 45 in Łódź. The induced neutron number must be much larger since the probability of detection of a single neutron penetrating polyethylene moderator is at the level of 1 percent (neutron initial energy dependent value).

We present results of Geant4 simulations of expected muon energy spectra at different depths underground, and number and energy distributions of muon induced gammas and neutrons. Results of simulations of neutron number distribution will be compared with measurements we have made in the three underground laboratories.

Registration number following "ICRC2015-I"

1014

Primary authors: Ms SOBCZYK, Agnieszka (NCBJ Łódź Poland, Lodz University of Technology); SZABELSKI, Jacek (National Centre for Nuclear Research); Mr KASZTELAN, Marcin (National Centre for Nuclear Research, Łódź, Poland)

Presenter: SZABELSKI, Jacek (National Centre for Nuclear Research)

Session Classification: Poster 3 DM and NU

Track Classification: DM-EX