

Draft

Evaluation of ionization produced by fast neutrons in Atlas muon detectors.

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1 Neutron energy spectrum and probability of interaction

The aim of this work is to estimate the ionization produced in muon detectors by fast neutrons (energy region .1 - 100 MeV). For this purpose four muon detectors were considered:

1. TGC, gas - $0.55CO_2+0.45$ n-pentan (C_5H_{12})
2. RPC, gas - tetrafluoretane ($C_2H_2F_4$)
3. CSC, gas - $0.6Ar+0.3CO_2+0.1CF_4$
4. MDT, gas - $0.95Ar+0.05CO_2$, pressure - 3 atm.

The neutron energy spectrum was parametrised following the work of A.Ferrari ($\sim 1/E$ up to 100 MeV) and normalised on the rate of neutrons with $E > 100keV$ calculated by M.Shupe. (Jul01 Baseline, rates - $30.0 \cdot kHz/cm^2$ (CSC), $11.0 \cdot kHz/cm^2$ (TGC/MDT), $0.5 \cdot kHz/cm^2$ (RPC)) as ¹

$$n(E) = 0.145 \cdot R/E_n, \quad (1.1)$$

where $R(1/cm^2 \cdot sec)$ and $E_n(MeV)$ are the rate and energy of neutrons.

¹Here and below energy E is in MeV.