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A Geant4 simulation to estimate the RPC sensitivity to neutral radiation

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The experiments at the Large Hadron Collider (LHC) operate in a large radiation background. With the increase of the luminosity of the LHC, estimates of the signal rate caused by neutral radiation should be assessed in order to infer the signal rate per unit area due to radiation.
A Geant4 simulation has been developed to estimate the sensitivity to gamma and neutrons of a double-layer RPC, modelling the ones installed in the ATLAS detector.
Primary gamma and neutron beams with energies varying in the region of interest for the LHC cavern background have been simulated. An analysis of the interactions occurring in the RPC materials has been carried out in order to extract the RPC sensitivity as a function of the energy of the impinging radiation.
The assumptions made to extract the results will be discussed, whose impact is particularly relevant for neutrons with energy below the keV. Preliminary results on the RPC sensitivities to gamma and neutrons will be presented.

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