

Simulations of the cosmic-veto system for the COMET experiment.

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In the COMET experiment searching for the muon-electron conversion not conserving leptonic numbers, a scintillator-strip-based veto system will be used to prohibit the COMET detector from fake signals initiated by cosmic muons. In order to verify the efficiency of the system, we have built its computer model and carried out various simulations. To tune the model, experimentally measured data are utilized. The simulations give the inefficiency of the cosmic-muon registration being below 0.0001, which meets requirements of the experiment. In addition, simulations of neutrons traversing a shield beneath the cosmic-veto system have been carried out using the Geant4 toolkit. A Geant4 application has been written with an appropriate detector design and possible spectrum of neutron's energy. Design of the shield is optimized to ensure the time loss concerned with fake veto signals caused by the neutrons from muon captures in target is tolerable. Materials of shield's layers are chosen, and optimum thicknesses of the layers are computed.

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