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Type: Neutrino Properties

Constructing a Muon Veto System for the MiniHALO Neutrino Detector for Neutrino-lead Cross Section Measurements

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In this talk I will summarize my work towards the development of a prototype detector named miniHALO that will be used to test the designed neutrino detection method to be employed in the HALO-1kT supernova neutrino detector. The miniHALO prototype will be placed at the COHERENT underground laboratory where it will be used to make the neutrino-lead cross section measurements at the supernova neutrino energy scale. In order to obtain very accurate measurements of the cross section, a muon veto system will be installed on the detector to detect the muon induced signals that can mimic the signals induced by the neutrinos. For building an optimized configuration of the scintillator plates for the muon veto, a suit of GEANT4 Monte Carlo simulations has been developed which include polyvinyltoluene polymer based scintillators that generate optical photons when traversed by the cosmic ray muons. Results from these simulations such as the energy deposited in the scintillator plates, neutrons multiplicities from muon-lead interactions in the detector, the optical photons generated in the scintillator plates from muon interactions will be discussed along with how these results can be used to veto muon induced signals in the detector.

email address

ssh313@uregina.ca

Please select: Experiment or Theory

Experiment

Primary author: Mr SAJID, Shayaan (University of Regina)

Presenter: Mr SAJID, Shayaan (University of Regina)

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