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Simulations of the Muon Veto for the PICO Experiment

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PICO is a direct Dark Matter detection experiment which focuses on elastic scattering of WIMPs (Weakly Interacting Massive Particle) with baryonic matter. The physics of the detector is based on the super heated liquid technique. The active liquid, presently C3F8, is kept at a temperature and pressure just above the boiling point. A slight perturbation in the liquid, e.g. energy deposited by a recoiling nucleus due to its elastic collision with an incoming neutron, can create a bubble. The neutron-induced bubbles develop indistinguishably from those induced by WIMPs. Therefore, understanding and predicting the expected neutron background is fundamental for the success of the experiment. One of the components of the neutron background are neutrons generated by muon interaction around the detector's active volume. In order to identify those background events the PICO experiment utilizes a muon veto. This presentation discusses the latest results of the muon veto GEANT4 simulations and MCNP neutron simulations used for the design of future muon veto for PICO500.

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