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Cosmogenic Neutron Backgrounds for EXO-200

The Enriched Xenon Observatory (EXO) is an experimental program searching for neutrino-less double beta decay in xenon-136. The current experiment, EXO-200, has achieved excellent sensitivity by minimizing radioactive backgrounds in a cleanroom environment, and by building the detector with carefully selected materials. However, backgrounds induced by neutrons produced by cosmic ray muons are not reducible by cleanliness and shielding alone. These backgrounds are studied in EXO-200 by selecting data shortly after the muon veto detectors are triggered. Muon showers are rich in neutrons, making a "neutron enriched" data sample. This data is then checked against Monte Carlo simulations of these backgrounds, and the neutron capture gamma background models can be validated. A technique for tagging and vetoing cosmogenic xenon-137 backgrounds for future experiments, such as nEXO, is presented.

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