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(G*) Radon Mitigation Strategies for the NEWS-G Dark Matter Experiment

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Contamination from radioisotopes are a major background source in rare-event experiments such as searches for dark matter and neutrinoless double beta decay searches. A common internal source of radioactive backgrounds that creates many challenges for these experiments is radon and its progeny. As a noble gas, it can easily enter the innermost part of the active target through diffusion, and can be continuously produced inside detector materials due to the decay of trace amounts of radium from uranium and thorium decay chains. The New Experiments With Spheres - Gas (NEWS-G) experiment currently being installed at SNOLAB, has launched a mitigation program to reduce the amount of radon produced by certain components. After describing the different strategies, the results obtained from different materials to remove radon will be discussed, along with the use of different target gases for NEWS-G detector. The reliability of these results are demonstrated through successfully trapping the radon. Finally, the integration of the radon removal system into the gas purification loop (a part of the gas handling system) for the NEWS-G detector will be discussed.

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