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Detecting Radon with a Spherical Proportional Counter

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In highly sensitive experiments searching for dark matter, monitoring and reducing background radiation levels is essential. Radon (Rn) is a radioactive noble gas, which can diffuse into experiments, leaving its daughters inside the detector to decay. From the U chain, ^{222}Rn has a half-life of 3.8 days. Some long-lived daughters, like ^{210}Pb will pollute detectors for long periods of time. Most materials will contain some traces of U and Th which will result in emanating Rn. Screening the material is therefore critical when building a low background detector. Typically, Rn is measured via an assay where the Rn is concentrated and transferred into a Lucas cell. The Lucas cell is then attached to a photomultiplier tube which detects the alpha particles from the decay of ^{222}Rn . This project explores an alternative decay detection method: a spherical proportional counter (SPC). Some potential advantages of a SPC compared to a Lucas cell would be the regeneration of the container and the use as a secondary trap. In this talk I will discuss the detector technologies, the experimental setup and the results from preliminary data taking.

Topics - Please choose one:

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