

Initial Characterization of Unequal-Length, Low-Background Proportional Counters for Absolute Gas-Counting Applications

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Characterization of two sets of custom unequal length proportional counters is underway at Pacific Northwest National Laboratory (PNNL). These detectors will be used in measurements to determine the absolute activity concentration of gaseous radionuclides (e.g., ^{37}Ar). A set of three detectors has been fabricated based on previous PNNL ultra-low-background proportional counters (ULBPC) designs and now operate in PNNL's shallow underground counting laboratory. A second set of four counters has also been fabricated using clean assembly of OFHC copper components for use in an above-ground counting laboratory. Characterization of both sets of detectors is underway with measurements of background rates, gas gain, energy resolution, and shielding considerations. These results will be presented along with uncertainty estimates of future absolute gas counting measurements.

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