

Radon Emanation Analysis

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Highly sensitive experiments, such as the LZ dark matter experiment, have backgrounds due to radon emanating out of materials. The radon emanation system at SD Mines is used to reduce radon background by measuring the emanation rate of radon out of these materials. If the emanation rate is too high, those objects can be replaced. Analysis of the emanation rate requires corrections when the detector's gain shifts, a log-likelihood analysis, and an understanding of background rates. Due to statistical uncertainty, the background for the system and its time dependence cannot be determined accurately from a single background run. However, co-adding multiple background runs together provides sufficient statistics. I will summarize my contributions to the Python code that performs this analysis, show how the co-added data constrains the background of the radon emanation system, and discuss the implications.

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