Abstract Rough Draft II

Measurement of the Emanation of Radon-222 from Cathode High Voltage Tubing for the LUX-ZEPLIN Dark Matter Experiment

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Commonly known as a fuel source in the animated sitcoms Futurama and Rick And Morty, dark matter, which composes approximately 85% of the universe's mass, remains highly elusive. The LUX-ZEPLIN (LZ) Dark Matter experiment seeks to address this "elephant in the room" by providing the first direct observation of dark matter. A primary obstacle to this endeavor is tuning out signals that can mimic that of dark matter. One such contributor to this signal mismatch is the beta decay of Rn-222, which has traces in almost every material on the planet. To mitigate these ubiquitous false signals, the LZ experiment has declared a maximum cumulative radiation level of approximately 46 mBq. To ensure this limit, the South Dakota School of Mines and Technology (SDSM&T) has employed the Radon Emanation System (RES) to assess radiation levels over time, allowing researchers to build a background profile for the LZ experiment. A recent assay from the RES has concluded that the material from LZ's Cathode High Voltage Tubing material provides a negligible contribution radiation limit.