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(G*) POS-J85 – SN0+ U-238 External Background Measurements using Radon Assay Technique

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ABSTRACT:
SNO+ is large multipurpose detector located at SNOLAB, Canada, Sudbury filled with liquid scintillator. The scintillator will eventually be loaded with a tellurium isotope, allowing to look for neutrino-less double beta decay which is extremely rare. This will determine if the neutrino is its own antiparticle. One of the main concerns for these rare event experiments is the presence of backgrounds, which could mask the signals of interest. This presentation will focus on Rn222, one of the most common backgrounds due to its excessive prevalence in the mine environment. Radon decays into daughters where the energies lie within the region of interest for neutrino-less double beta decay. The detector is housed in a large cavity that is filled with ultrapure water and has a nitrogen cover-gas in order to avoid contamination. This presentation will focus on radon assays, a technique that was developed for the SNO experiment. Assays are performed frequently at different positions to monitor the radon levels. During a radon assay, radon is trapped with a ZnS coated lucas cell for a period of time and known amount of flow. This lucas cell can then be connected to a PMT, which detects the decayed alphas that are used to calculate the number of radon atoms in the cavity. This external technique is a crucial part of measuring and monitoring the low background for the experiment.

Author: Mr HUSSAIN, Syed M Adil (Laurentian University)

Presenter: Mr HUSSAIN, Syed M Adil (Laurentian University)

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