Contribution ID: 5

Type: not specified

Radon-222 Gas Assays of the SNO+ Detector

Thursday 17 August 2023 10:15 (15 minutes)

The SNO+ detector is located at SNOLAB 2km underground in Sudbury, Ontario. SNO+ is a large multipurpose detector looking for an extremely rare and proposed neutrino-less double beta decay, if observed will determine the Majorana nature of neutrinos. Therefore, backgrounds that may obscure the data are consistently monitored. Being underground prevents backgrounds from the cosmic flux, however, the mine environment presents other backgrounds. One of the most prevalent backgrounds comes from Radon-222, which is a daughter isotope of Uranium 238. The daughter isotopes of Radon decays by producing radioactive emissions that lies in the region of interest (ROI) for neutrino-less double beta decay. To prevent Radon-222 ingress, a cover-gas system using pure nitrogen was implemented in the SNO+ cavity and the Universal Interface (UI). The effectiveness of this cover-gas is determined through radon assays; a technique based on the signature alpha decays of Radon. The frequent assays are taken from various locations of the cover-gas and the sample is taken into custom made ZnS coated Lucas cells which are then brought to surface and placed into the DAQ system for counting. The radon present in the sample is then compared with the mine air and a reduction factor is determined; the SNO+ UI has a design specification of 10-5 reduction factor to mine air. This talk will present recent assay results and the challenges that have arisen during this time.

Topics - Please choose one:

Particle

Author: MOLINA COLINA, Ana Carla Presenter: MOLINA COLINA, Ana Carla Session Classification: Session I