Contribution ID: **17**   Type: **not specified**

DDA Quantification and Umbilical Cleaning

Monday, August 19, 2024 4:35 PM (10 minutes)

SNO+ is a 12-meter diameter neutrino detector containing 780 tons of liquid scintillator, linear alkylbenzene (LAB), located 6800 feet underground. The scintillator contains a variety of chemical species to optimize the emitted light that will be captured by the photomultiplier tubes. N, N-dimethyldodecylamine (DDA) aims to improve the stability of the scintillator cocktail. Prior to its addition to the detector, DDA is distilled three separate times to obtain different levels of purity. In between distillations, the system is washed with LAB to minimize contamination. Quantification of DDA within LAB samples from the distillation system will help determine when the system has been sufficiently washed. UV-Vis spectroscopy was used to create a concentration curve of samples of known concentration of DDA. The overlapping spectrum of LAB and DDA limit the wavelengths available to analyze, it was found that minor changes of the spectra over time affected reproducibility.

In addition to the contents of the detector, regular calibration is required to ensure the accuracy of the measurements. Calibration is achieved with the use of the umbilical, a 30-meter-long cable containing a light or radioactive source, deployed in the detector. During the fabrication of the umbilical, SiliGel-612 seeped and contaminated the outside of the umbilical. The umbilical has been soaking in LAB for an extended timeframe and periodical measurements of the LAB have been conducted by UV-Vis spectroscopy. From these measurements, we concluded that the contamination has been leaching off the umbilical based on shifts in the spectrum indicative of light scattering. To further clean the umbilical, sonication in scintillator was utilized as a gentle cleaning method. The contaminants and the effectiveness of the cleaning method were assessed with attenuated total reflectance Fourier transformed infrared (ATR-FTIR) spectroscopy.

What area of study best describes your talk?

Physics

If you answered 'Other', please provide the study area.

Primary author: LEVESQUE, Danica (SNOLAB)

Presenter: LEVESQUE, Danica (SNOLAB)

Session Classification: Presentations