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SNO+ Calibration with the 16N Source (G)*

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SNO+ is a multi-purpose scintillator based neutrino experiment located 2 km underground at SNOLAB, Sudbury, Ontario. SNO+ reuses the Sudbury Neutrino Observatory (SNO) detector, consisting of a 12 m diameter acrylic vessel that will be filled with 780 tonnes of ultra-pure organic liquid scintillator. The primary goal of the experiment is a search for neutrino-less double beta decay with ^{130}Te loaded into the liquid scintillator. In addition, SNO+ aims to measure low energy solar neutrinos, reactor anti-neutrino oscillations, geo-neutrinos as well as the neutrinos from a possible galactic supernova. The detector has been filled with ultra-pure water since May 2017 in preparation for the scintillator phase.
The reconstructed energy scale, energy resolution, reconstructed position resolution and detection efficiency of the detector are measured using calibration sources deployed into the detector. During the water phase the primary calibration source is the de-excitation of ^{16}O from the decay of ^{16}N. The ^{16}N gas is transported to the detector and injected into a suspended decay chamber all the while undergoing β decays. Decays within the source chamber are detected and tagged through a PMT and plastic scintillator enclosure. The ^{16}O decay product is in excited state and emits 6.1 MeV γs that can penetrate through the container. The source can be positioned along three axes, x, y and z, using the side ropes and the umbilical retrieval mechanism. A full ^{16}N scan has been performed in November 2017 and calibration data has been taken for 72 different locations inside the acrylic vessel. This presentation will describe the ^{16}N calibration for SNO+, and furthermore discuss the calibration results in greater detail.

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