

Understanding the SNO+ Detector

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The SNO+ detector is located in the Creighton Mine near Sudbury, Canada. It reuses the SNO detector for a broad neutrino-physics program, with emphasis on neutrinoless double beta decay. The heart of the SNO+ detector is a 12m-diameter acrylic sphere filled with liquid scintillator and the double beta decay isotope, ^{130}Te . Light is emitted when charged particles pass through the scintillator, and is detected by an array of ~9,500 photomultiplier tubes. Event energies and positions are reconstructed using hit-level PMT information. Several aspects of the PMT response, a critical input to reconstruction resolution, are being calibrated as the detector is commissioned. During SNO, an aspect of PMT response called angular response was found to change over time. Modeling this time evolution to better understand the angular response is underway, and is essential for accurate energy reconstruction in SNO+. In addition, first runs of electronic calibration and comparison to SNO results show that SNO+ is accurately extracting the relevant constants.

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