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Towards Liquid Scintillator Phase of the SNO+ Neutrino Detector

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Located within the SNOLAB facility at VALE's Creighton mine in Sudbury, Ontario, SNO+ is an experiment that studies the properties and behaviour of neutrinos. With a radius of 6m, the detector is composed of a spherical acrylic shell that has been filled with ultrapure water, which is now being replaced with linear alkylbenzene (LAB) and poly(p-phenylene oxide) (PPO), and finally with LAB and PPO along with Tellurium. The acrylic vessel (AV) is contained within a cavity filled with ultrapure water, and is held in position so that it is centered within a shell of photomultiplier tubes (PMTs) that capture traces of scintillation light produced by particle interactions with LAB.
The primary goal of SNO+ is to search for neutrinoless double beta decay, however its additional goals include the search for nucleons possibly decaying into neutrinos, to study proton-electron-proton (pep) and carbon-nitrogen-oxygen (CNO) cycles within the sun, to study oscillation parameters of of geo- and reactor-antineutrinos, and to detect and study neutrinos from supernova explosions.
Currently, SNO+ is undergoing the scintillator (LAB & PPO) fill and is continuing to record physics data, even though it contains both ultrapure water and LAB in the AV. In this presentation, I will introduce the SNO+ experiment and its physics program. I will then report on the process and status of filling operations, and discuss how to interpret and utilize the information collected during this period for future phases.

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