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Detection of Supernova Neutrinos in the SNO+ Detector

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The SNO+ experiment is a multi-phase neutrino detector located at the SNOLAB underground physics laboratory in Sudbury, Ontario, Canada. Currently, the 12 m diameter acrylic vessel (AV) is filled with 780 tonnes of the liquid scintillator, linear alkylbenzene (LAB), doped with the fluor 2,5-diphenyloxazole (PPO) to a concentration of 2.2 g/L. The detector is viewed by approximately 9400 photomultiplier tubes (PMTs) and is surrounded by an additional shielding volume of 7000 tonnes of ultra-pure water. SNO+ has a myriad of physics goals, including the search for neutrino-less double beta decay ($0\nu\beta\beta$), refined measurements of the solar neutrino flux, and the potential for observing neutrinos in the case of a supernova event in the galaxy. A supernova releases 99% of its energy in the form of neutrinos, so any nearby supernova would produce a strong neutrino signal in neutrino detectors such as SNO+. This talk will cover the detection of supernova neutrinos in SNO+ as a liquid scintillator detector, and the potential of the water shielding volume to act as a water Cherenkov detector to provide additional directional information on a supernova event.

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