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(G*) AmBe Source Calibrations in SNO+ Partial Scintillator Phase

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SNO+ is a multipurpose neutrino experiment located approximately 2 km underground in SNOLAB, Sudbury, Canada. The second phase of the experiment is underway and consists of filling the detector with 780 tonnes of Linear Alkyl Benzene (LAB) scintillator. The fill is expected to be completed spring 2021. During this partial fill stage a number of external calibration campaigns have been completed in an effort to quantify the detector response. We look to accomplish our goals by analyzing a deployed neutron source, ^{241}Am^{9}Be. A key component of this signal is the identification of the prompt and coincident signals comprised of 4.4 MeV and 2.2 MeV γ's respectively. The characteristic energy spectrum allows for a verification of the energy reconstruction and photon light yield in scintillator. The 2.2 MeV γ from the inverse beta decay neutron capturing on hydrogen allows for an in depth analysis of neutron capture efficiency. The low trigger threshold of the SNO+ detector allows for a substantial detection efficiency of these neutrons. The AmBe source mimics the reactor antineutrino signal within SNO+. In particular, we look to further constrain measurements on the reactor antineutrino energy spectrum and the neutrino oscillation parameters, Δm^2_{12}, and $\sin^2\theta_{12}$. This presentation outlines the effort on the AmBe calibration data and analysis during the partial fill phase.

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