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(G*) (POS-33) Optical Calibration of the SNO+ Detector using Internal Backgrounds

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The SNO+ experiment is a multipurpose neutrino detector located 2 km underground at SNOLAB in Sudbury, Ontario. The primary goal of the experiment is to search for neutrinoless double beta ($0\nu\beta\beta$) decay in liquid scintillator loaded with ^{130}Te in a low-background environment. An observation of a $0\nu\beta\beta$ decay signal would demonstrate the Majorana nature of neutrinos. In order to resolve such a rare decay process, a precise optical calibration of the SNO+ detector is critical. This work presents a sensitive method of investigating the attenuation parameters in liquid scintillator by modelling the simulated radial light yield profiles of various internal background sources. The scintillator materials utilized in the SNO+ Monte Carlo (MC) simulation framework have been fine-tuned based on *ex-situ* measurements of the light yield and comparison to detector data.

Primary author: Dr RICCETTO, Serena (Queen's University)

Co-authors: Ms DEHGHANI, Rayhaneh (Queen's University); ALLEGA, Anthony (Queen's University)

Presenters: Dr RICCETTO, Serena (Queen's University); Ms DEHGHANI, Rayhaneh (Queen's University); ALLEGA, Anthony (Queen's University)

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