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Muon-Induced Production of $^{16}\text{N}$ NOAH OBLATH, University of Washington, SUDbury Neutrino Observatory Collaboration —
The Sudbury Neutrino Observatory (SNO) is a 1000-tonne heavy-water Cherenkov neutrino detector located in Sudbury, Ontario, Canada. Cosmic-ray muons pass through SNO at a rate of approximately 2.6 per hour, and they are easily vetoed. However, muon-induced spallation products with long lifetimes represent a background that must be considered. In particular, $^{16}\text{N}$ can be produced by (n,p) and ($\mu^-$, $\nu_\mu$) reactions on $^{16}\text{O}$. The $\beta^-$ decay of any $^{16}\text{N}$ ($T_{1/2} = 7.13$ s, $Q = 10.44$ MeV) in the heavy water would represent an important background in SNO’s neutrino measurements. We have investigated the production of $^{16}\text{N}$ by muons in the salt phase of the SNO experiment and found an initial $^{16}\text{N}$ activity in the 391-day salt-phase dataset consistent with zero: $-0.97 \pm 1.3$ kton$^{-1}$. The result will be compared with theoretical expectations.