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POS-46 A Sensitive Assay Technique for 210Pb in Water Developed for the SNO+ Experiment

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SNO+ is a multipurpose neutrino physics experiment adapting the Sudbury Neutrino Observatory (SNO) detector located 2 kilometers underground in the SNOLAB facility in Sudbury, Canada. A sensitive technique to assay 210Pb in water was developed by SNO+. For the lower energy measurements of interest to SNO+, radon daughter radioisotopes, especially 210Po and 210Bi supported by 210Pb, are important. Since water will be used in the purification of both the liquid scintillator and the tellurium that will be chemically loaded in SNO+ to search for neutrinoless double beta decay, the 210Pb assay technique will be used to carefully monitor and control 210Pb levels in the water. The technique is capable of measuring 0.4 +/- 0.13 mBq/mˆ3 of 210Pb for a 10 tonne assay. This 210Pb procedure represents an extension of the water assay technique, based on the capture of Ra and Th radioisotopes using Hydrous Titanium Oxide (HTiO), that was developed by the SNO experiment. Ra sensitivities equivalent to 232Th: 4 x 10ˆ-16 gTh/D2O and 238U: 3 x 10ˆ-16 gU/g D2O were achieved with this technique (NIM A 604: 531-535 (2009)). The HTiO technique will be used in SNO+ to monitor 238U and 232Th contamination levels in the shielding water and the performance of the water purification system at SNOLAB.

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