ID: **P3.2-392** Type: **E-poster**

Beta Cell Performance Improvements Using Silicon Photomultiplier Well Detectors for Beta-Gamma Radioxenon Systems

Wednesday, 21 June 2023 11:19 (1 minute)

Prior efforts in developing a silicon beta cell as a potential improvement to scintillating plastic in beta-gamma systems resulted in a design with high resolution, capable of resolving different conversion electron energies in the metastable radioxenons, but a higher threshold that cut off low energy X rays. Switching from a photomultiplier tube based NaI well detector to a low-voltage silicon photomultiplier (SiPM) based detector resulted in a significant improvement to the energy threshold from nearly 45 keV to below 30 keV. When combined with changes to the high voltage bias supply, energy thresholds on the beta cell have been reduced to below 22 keV. The SiPM well detector also drastically improved run-to-run reliability by eliminating noise dependence on beta cell positioning.

E-mail

johnathan.slack@pnnl.gov

Promotional text

High resolution beta spectrometry has the potential to improve radioxenon sensitivities across the IMS network. Improving the performance of these detectors presents an opportunity for more intricate analysis and integration into complimentary datasets.

Oral preference format

pre-recorded video

Primary author: SLACK, Johnathan (Pacific Northwest National Laboratory (PNNL))

Co-authors: Mr HAYES, James (Pacific Northwest National Laboratory (PNNL)); Mr FOXE, Michael (Pacific Northwest National Laboratory (PNNL)); Mr MAYER, Michael (Pacific Northwest National Laboratory (PNNL))

Presenter: SLACK, Johnathan (Pacific Northwest National Laboratory (PNNL))

Session Classification: Lightning talks: P2.2, P3.2, P3.6

Track Classification: Theme 3. Monitoring and On-Site Inspection Technologies and Techniques: T3.2 Radionuclide Technologies and Applications