NASA SBIR/STTR Technologies

Phase II: Fast Neutron Dosimeter for the Space Environment

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Identification and Significance of Innovation

- Space-flight requires accurate neutron dose assessment capable of providing real-time dose readings during a mission to alert crews of hazardous changes in the radiation environment.
- Existing neutron radiation monitors used in space flight are either too bulky or do not provide real-time personal dosimetry.
- DPA scintillator coupled to a CMOS solid-state photomultiplier provides an active, light weight dosimeter within a small form factor.

Phase-II Goals Achieved:

- Advanced state-of-art for DPA scintillation growth (>1-cm cubes)
- Developed DPA-SSPM signal and data processing electronics
- Demonstrated performance of prototype for reporting neutron dose and rejecting proton events
- Prepared for transition to Phase-III

DPA-SSPM Neutron Dosimeter Capabilities:

- Neutron event-by-event dose analysis capabilities
- Neutron detection for energy range of ~2 to 200 MeV
- Flux up to 10^5 cm^{-2} s^{-1}
- Tissue equivalent response for neutrons
- Proton and gamma rejection capabilities
- FPGA-based readout and controls

Contacts

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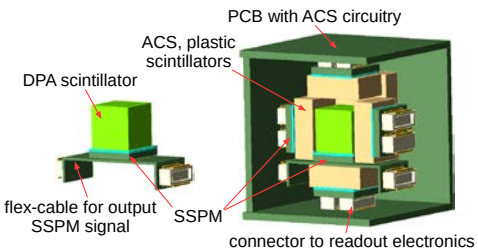

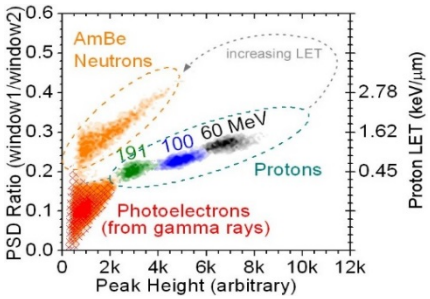

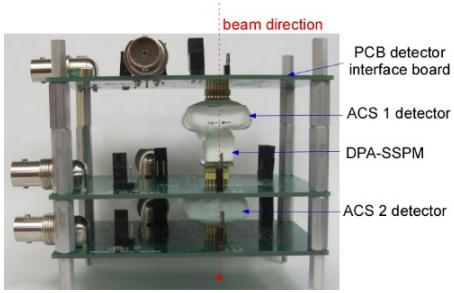

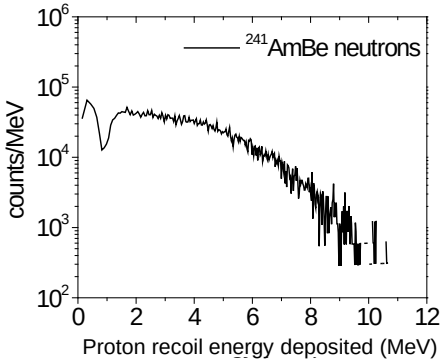

NASA and Non-NASA Applications

For NASA, these lightweight, compact and inexpensive sensors can provide real-time rate and integrated dose information for area monitors, personal dosimeters, solar particle monitors, and radiation monitors on NASA satellites.

Non-NASA applications include personal dosimeters for waste monitoring, border monitoring for homeland security, protection protocol for satellites and ground based equipment from solar flares, and radiation monitors for high altitude flights and space tourism.