NASA SBIR/STTR Technologies

09-2x14.01-9159 –Fast Neutron Dosimeter

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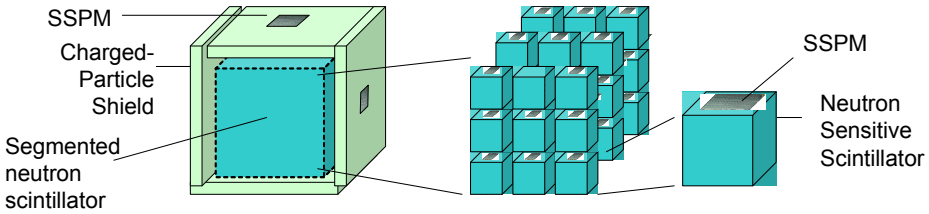
Identification and Significance of Innovation

- DPA scintillation material makes compact dosimeter more sensitive
  - Exhibits *radiation type & mass* dependence in emission time
- CMOS SSPM allows low-power and low form factor.
- Scintillator plus charged particle shield allows particle identification for charged particles, neutrons and gamma rays

Expected TRL Range at the end of Contract: 6

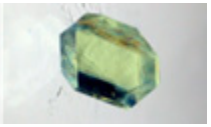
SSPM Neutron Dosimeter Concept



Technical Objectives

- Determine conditions for growing large scintillation crystals of DPA.
- Determine optimum design for rejecting proton and gamma-ray events.
- Determine optimum information needed for assessing neutron energy and dose from the energy deposited, or dose.

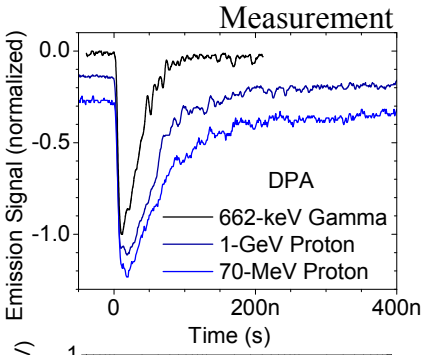
DPA crystal

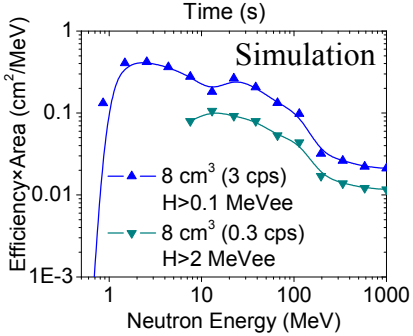


Work Plan

- Select and purchase materials
- Grow scintillation crystals
- Characterize scintillation material
- Build experimental scintillator and coincidence apparatus
- Test and evaluate experimental apparatus
- Design and build prototype
- Evaluate prototype
- Transition to Phase-III

Phase-1 Results





Project Milestones and Deliverables

Milestones:

- Fabrication of large-volume DPA scintillation material
- Packaging of large-volume DPA scintillation material
- Characterization of the critical components
- Test prototype at accelerator (i.e. NSRL)

Deliverables:

- Large DPA scintillation crystals
- Dosimeter prototype with event-by-event storage capability.

NASA and Non-NASA Applications

- Low-earth orbit and Deep space missions
- Ground-based radiation monitoring research such as at the NASA Space Radiation Laboratory at Brookhaven National Laboratory.
- Nuclear and high-energy physics experiments
- Radiation monitoring for border security

Firm Contacts

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NON-PROPRIETARY DATA