

Monte Carlo Simulation for Performance Analysis of a ^{252}Cf -Driven PGNAA Landmine Detection and Identification System

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- This research aims to model a landmine detection system using Prompt Gamma Neutron Activation Analysis (PGNAA), which identifies explosives by detecting gamma emissions from key elements such as hydrogen, carbon, nitrogen, and oxygen.
- Gamma signature peaks from these four elements were used to validate the model.
- The presence of hydrogen, carbon, and nitrogen peaks can be used to confirm the existence of explosive landmines, enhancing the reliability and flexibility of our system compared to previous systems that rely solely on the nitrogen peak.
- The simulation focused on optimizing moderator and shielding parameters and evaluating the system's detection capabilities. Performance analysis was conducted by varying factors such as sample composition, casing type, burial depth, and soil type.
- The results confirmed the system's ability to detect explosives even when encased in plastic or metallic casings and buried in soil.

Technical Track

Student Competition

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