ID: Type: **Poster**

Using Antineutrinos to Verify the Nuclear Nature of a Suspect Nuclear Test Based on Seismic Event Coincidence

The default means of confirming the nuclear nature of an explosion is to detect radioactive noble gases which seep out slowly from underground tests and sometimes escape detection entirely. Detection of antineutrinos coincident with a seismic signal from the International Monitoring System (IMS) or other seismic networks could provide a tool to more rapidly verify the true nature of a suspect nuclear event. Compared to previously explored antineutrino-based techniques, a key advantage to this combined approach is that it requires few antineutrino events to confirm the nuclear nature of the event due to the cueing information provided by the seismic system. The coincidence window is short (~10 seconds) so that the likelihood of false coincidence in a low background detector will be low. This will make detector sizes somewhat more tractable facilitating stand-off deployment. This paper presents the findings of an investigation into the feasibility of using antineutrino detectors to confirm the nuclear nature of a suspect nuclear test. We present the sensitivity of detection as a function of standoff distance, bomb yield, for a variety of detector technologies. We include in our analysis neutrino oscillation effects and realistic backgrounds from past neutrino experiments.

Primary author: DALNOKI VERESS, Jacob Rolf Ferenc (James Martin Center for Nonproliferation Studies (CNS))

Presenter: DALNOKI VERESS, Jacob Rolf Ferenc (James Martin Center for Nonproliferation Studies (CNS))

Track Classification: 3. Advances in sensors, networks and processing