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detectors: an evaluation of their use for monitoring of nuclear explosions

Historically, nuclear explosion monitoring has been performed via atmospheric transport of radionuclides. In this paper, we aim to answer the question “Is there a role for antineutrino detectors for monitoring of nuclear explosions?” The International Monitoring System (IMS) is a network of detectors established under the Comprehensive Nuclear-Test-Ban Treaty that continuously monitors the world for nuclear explosions. While the IMS utilizes conventional detection techniques (seismic, infrasound, hydroacoustic, and airborne radionuclides), there is often discussion of the potential for antineutrino detectors to detect a nuclear explosion. We suggest that the current generation detector capabilities and cost associated with antineutrino detectors make their use within the IMS-like monitoring infrastructure prohibitive at this time, especially when compared to an expanded capability of current IMS technologies. Throughout this paper, we discuss the capabilities and requirements of antineutrino detectors and provide the information utilized in arriving at the above conclusion.

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