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WATCHMAN Sensitivity to Remote Reactor Discovery

The Water Cherenkov Monitor of Antineutrinos (WATCHMAN) is a planned demonstration of far-field reactor monitoring for nonproliferation. To date, antineutrino experiments dedicated to nonproliferation used compact sctintillator based detectors situated on the order of meters from the reactor core. This proximity to the reactor requires accommodations by the host facility, while detectors situated on the order of kilometers will allow for unobtrusive monitoring and verification of reactor activities. This poster details the sensitivity of the WATCHMAN detector to exlude the existence of undeclared reactors from a specified radial distance, and the presence of a hidden reactor near a declared reactor facility through Monte Carlo. The energy resolution and the lack of sensitivity to the lower portion of the reactor antineutrino energy spectrum limits the ability of WATCHMAN to simultaneously identify the range and power of a nuclear reactor complex.

Mini-abstract

We explore the sensitivity of the WATCHMAN detector to discover or exclude nuclear reactors.

Experiment/Collaboration

WATCHMAN

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