

Abstract Submitted
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The Watchman Detector Design¹ STEVEN DAZELEY, Lawrence Livermore Natl Lab, WATCHMAN COLLABORATION — The Watchman collaboration is proposing a kiloton scale antineutrino detector of reactor-based antineutrinos for non-proliferation purposes. As an added bonus the detector will also have the capability to search for evidence of sterile neutrino oscillation, super-nova antineutrinos and, in a second phase, measure the neutrino mass hierarchy. Despite that fact that KamLAND demonstrated the feasibility of kiloton scale, long distance antineutrino detection with liquid scintillator, similar detectors at the megaton scale remain problematic for environmental, cost and light attenuation reasons. Water, with gadolinium added for neutron sensitivity, may be the detection medium of choice if its efficiency can be shown to be competitive with scintillator. The goal of the Watchman project, therefore, is to demonstrate medium distance reactor antineutrino detection, and thus demonstrate the feasibility of moving to water-based megaton scale antineutrino detectors in the future. In this talk I will describe the scope of the experiment, the physics and engineering challenges involved, the proposed design and the predicted performance of the experimental non-proliferation and high-energy physics program.

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