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SANDD: A directional antineutrino detector with segmented ^6Li -doped pulse-shape-sensitive plastic scintillator

We present a complete characterization of a small (9-liter) and mobile ^6Li -doped pulse-shape-sensitive plastic scintillator antineutrino detector called SANDD (Segmented AntiNeutrino Directional Detector), constructed for the purpose of near-field reactor monitoring with sensitivity to antineutrino direction. A detailed Monte Carlo simulation code was developed and validated to model the performance of the detector. Analysis cuts were developed to maximize the antineutrino detection efficiency and minimize the background. The antineutrino detection efficiency is estimated to be 18%. An uncertainty of 23 degrees in the direction of the reactor antineutrino flux is predicted from 100 detected antineutrino events.

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Mini-abstract

A directional antineutrino detector is characterized and its performance is predicted via simulation

Experiment/Collaboration

SANDD

Primary author: Ms SUTANTO, Felicia (Lawrence Livermore National Laboratory and University of Michigan)

Co-authors: Dr MABE, Andrew (Lawrence Livermore National Laboratory); Dr REEDY, Edward (Lawrence Livermore National Laboratory); Prof. JOVANOVIC, Igor (University of Michigan); Dr BRODSKY, Jason (Lawrence Livermore National Laboratory); Mr DUVALL, Mark (University of Hawaii); Dr MENDENHALL, Michael (Lawrence Livermore National Laboratory); Dr BOWDEN, Nathaniel (Lawrence Livermore National Laboratory); Dr AKINDELE, Oluwatomi (Lawrence Livermore National Laboratory); Dr DAZELEY, Steven (Lawrence Livermore National Laboratory); Dr CLASSEN, Timothy (Lawrence Livermore National Laboratory); Dr LI, Viacheslav (Lawrence Livermore National Laboratory); Dr ZHANG, Xianyi (Lawrence Livermore National Laboratory)

Presenter: Ms SUTANTO, Felicia (Lawrence Livermore National Laboratory and University of Michigan)

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