

# Tagging Correlated Events in a Small-Scale Liquid Scintillator Detector

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This contribution focuses on a small-scale liquid scintillator detector, serving as a test setup for the Jiangmen Underground Neutrino Observatory (JUNO) experiment. JUNO is a next-generation medium baseline neutrino experiment located in China. The experiment has a broad physics program and the main goals are to determine the neutrino mass ordering and measure three oscillation parameters with sub-percent precision. JUNO's central detector is an acrylic sphere  $\sim 35.4$  meters in diameter filled with 20 kt of liquid scintillator. It is equipped with 43212 photomultiplier tubes (PMTs) providing  $\sim 75\%$  of photo-coverage. As the detector approaches its final commissioning phase, comprehensive testing of various components of the experiment is crucial.

The presented test setup, located at Legnaro National Laboratory in Italy, consists of  $\sim 20$  kg of JUNO liquid scintillator watched by 48 2-inch PMTs. This setup is equipped with JUNO's readout electronics and data acquisition (DAQ) and it was mainly designed as a test-bench for the full processing chain.

In this contribution, we present preliminary results on the feasibility of tagging time-correlated events, exploiting the  $^{214}\text{Bi}$ - $^{214}\text{Po}$   $\beta$ - $\alpha$  coincidence.

To ensure accurate energy measurements, we performed an energy calibration using several radioactive sources. The calibration procedure establishes a precise energy scale, essential for subsequent analyses.

$^{214}\text{Bi}$ - $^{214}\text{Po}$  coincidences, characterized by a time difference of approximately  $230 \mu\text{s}$ , close to the timing of JUNO's main signal, inverse beta decay events, provide an opportunity to test part of the selection strategy. The results show approximately 10 thousand  $^{214}\text{Bi}$ - $^{214}\text{Po}$  candidates acquired after  $\sim 15$  hours of data acquisition.

## Poster prize

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