

IBD selection study at TAO

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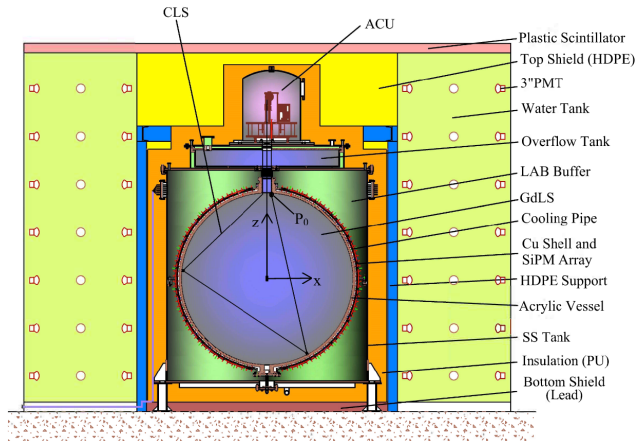
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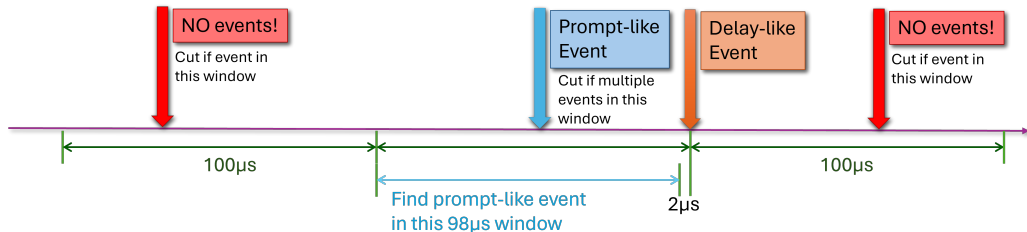


TAO serves as a satellite detector of JUNO for high-resolution reactor antineutrino spectrum measurement.

- World leading energy resolution 2.8% @Ge-68, further improvements expected.
- Enable studies of fine spectral structures and tests of reactor flux models.
- TAO began physics data taking on Feb. 10, 2026; this work presents the IBD selection and prompt energy spectrum measurement.



Muon Veto: The CD events in certain time window after muon events are vetoed, pick possible delay events for later selection.



Pairing: For each Delay-like candidates, search for the prompt events in $[-100, -2] \mu\text{s}$ time window.

Multiplicity Cut: no other non-muon events should appear in $[-200, 100] \mu\text{s}$ time window of delay events.

After pairing, cuts of **delay energy**, **fiducial volume** (for prompt event only), **prompt-delay distance** are applied.

The prompt signal energy spectra from the reactor-on and reactor-off data after all the above cuts is shown below.

- The subtraction of reactor-on over reactor-off is presented to extract the IBD signal.
- In the future, the spectrum will be used to generate unfolded neutrino energy spectra, to compare with theoretical prediction.

