Chair of Galileo, from which, according to tradition, he gave lectures - Credits: Univ. of Padova - M. Pistore

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JUNO OSIRIS Online Trigger

Monday, 22 February 2021 11:40 (5 minutes)

JUNO is a 20 kt liquid scintillator detector under construction in Jiangmen, China, whose goal is to determine the neutrino mass hierarchy. Decay of radioactive isotopes in the liquid scintillator can mimic neutrino signal events. In order to meet the stringent requirements on the radiopurity of the liquid scintillator in JUNO experiment, the OSIRIS pre-detector is being designed to monitor the liquid scintillator during the several months of filling the large volume of JUNO. OSIRIS will contain 20 ton of scintillator and will be equipped with 76 20-inch PMTs. The data acquisition system will have no global hardware trigger: instead, each PMT will provide a data-stream composed of the digitized PMT pulses, each containing a time stamp. Based on the latter, dedicated software will organize these data streams into events by sorting the time stamps and apply trigger logics. To optimize the trigger conditions, physics events are generated from the Geant4-based OSIRIS simulation software. Then the output of photon hits on all PMTs are transferred into our DAQ simulation software where dark counts are also simulated. Afterwards, different trigger conditions are applied in the event builder. This talk will discuss the final trigger setup as a function of ^{14}C beta-decay event rate and dark rates of PMTs. Our goal is to achieve the optimal trade-off of maintaining a low dark noise event rate with a high trigger efficiency to detect ^{14}C events.

Collaboration name

JUNO

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