



Contribution ID: 79

Type: **Oral presentation**

Global Trigger System of JUNO Central Detector

Tuesday 20 October 2020 07:00 (20 minutes)

As a neutrino experiment, the Jiangmen Underground Neutrino Observatory (JUNO) aims to determine the neutrino mass ordering along with other purposes. The Central Detector (CD) of JUNO is a 20k ton liquid scintillator, has diameter 35.4m. About 18000 photomultipliers (PMT) spread on the surface of the CD sphere to detect the scintillation light.

As the dark noise of the PMTs is quite high (about 50kHz), a global trigger system is designed to reduce the trigger rate and eliminate non-physics signals. The huge size of the CD leads to large Time of Flight (TOF) difference with different reaction vertex. The global trigger system implements a simple online Vertex Fitting Logic (VFL) to calibrate the TOF difference and “guess” the event vertex. If one or more vertex matches current PMT hit information, a trigger accept will be generated. With this algorithm, the trigger window could be reduced to 50ns and significantly reduce the influence of PMT dark noise.

The architecture of the global trigger system will be introduced in this talk. We will also explain the mechanism of the VFL algorithm.

Minioral

Yes

IEEE Member

No

Are you a student?

No

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Session Classification: Oral presentations TRIG01

Track Classification: Trigger Systems