Contribution ID: **349** Type: **Poster**

Real-time Charge Reconstruction Algorithm on FPGA for Neutrino Physics at JUNO

Friday, 21 June 2024 17:30 (2 hours)

Neutrino experiments require high-speed data processing to extract valuable insights from large data sets. This poster presents an advanced real-time charge reconstruction algorithm for neutrino physics applications at the Jiangmen Underground Neutrino Observatory (JUNO), implemented on a field-programmable gate array (FPGA) platform.
The algorithm is designed to exploit the processing capabilities of the FPGA installed on the readout boards, ensuring real-time reconstruction of the charge based on the processing of the experiment's Large Photomultipliers'fully sampled waveform. By exploiting the flexibility and reconfigurability of FPGAs, the proposed solution achieves a balance between computational complexity and resource utilisation, making it well suited to address the demanding requirements of the JUNO experiment.
This poster outlines the key features of the algorithm, including its ability to handle high throughput data streams with low latency, its versatility and robustness in detecting the characteristics of the input data, and its performance evaluated on an actual JUNO electronics board.
It further demonstrates the potential of FPGA-based solutions to advance the field of neutrino physics. In particular, to detect transient astrophysical phenomena that would otherwise be lost.

Poster prize

No

Given name

Lorenzo

Surname

Lastrucci

Institutional email

lorenzo.lastrucci@unipd.it

Gender

Male

Collaboration (if any)

JUNO

First affiliation

Università degli Studi di Padova

Second affiliation

Istituto Nazionale di Fisica Nucleare - Padova

Primary author: LASTRUCCI, Lorenzo (Istituto Nazionale di Fisica Nucleare)

Presenter: LASTRUCCI, Lorenzo (Istituto Nazionale di Fisica Nucleare)

Session Classification: Poster session and reception 2

Track Classification: Reactor neutrinos