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The online event classification software in the JUNO experiment

The Jiangmen Underground Neutrino Observatory (JUNO) aims to determine the neutrino mass ordering (NMO) with a 3-sigma confidence level within six years. The experiment is currently in the commissioning phase, focusing on filling the liquid scintillator and evaluating detector performance. During physics data taking, the expected data rate after the global trigger is approximately 40 GB/s, which will be reduced to [~]60 MB/s using online event classification (OEC) software.

This contribution presents the software design of the online event classification (OEC) system, including the multithreaded low-level event classification (LEC) and single-threaded high-level event classification (HEC) modules. Additionally, a middleware has been developed to facilitate the integration of offline algorithms into the online system. Finally, we discuss the computing performance observed during data acquisition.

Significance

The OEC is specifically designed for neutrino experiments, unlike the HLT used in collider experiments. Instead of discarding events, it reduces their size. Additionally, it performs event-level correlation analysis to further enhance selection purity.

References

Experiment context, if any

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