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Vertex Reconstruction in JUNO with Traditional Methods

The Jiangmen Underground Neutrino Observatory (JUNO), currently under construction in the south of China, is the largest Liquid Scintillator (LS) detector in the world. JUNO is a multipurpose neutrino experiment designed to determine neutrino mass ordering, precisely measure oscillation parameters, and study solar neutrinos, supernova neutrinos, geo-neutrinos and atmospheric neutrinos. The central detector of JUNO contains 20,000 tons of LS and about 18,000 20-inch as well as 25,000 3-inch Photomultiplier Tubes (PMTs). The energy resolution is expected to be $3\%/\sqrt{E(\text{MeV})}$. In this study, four vertex reconstruction algorithms using charge and time information collected by photomultiplier tubes were analyzed comprehensively. The effects of photomultiplier tube properties were also investigated. The results indicate that the transit time spread is the main effect degrading the vertex reconstruction, while the effect of dark noise is limited.

Significance

References

Speaker time zone

Compatible with Asia

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