

Optimization of the MCP-PMT performances for JUNO

The Jiangmen Underground Neutrino Observatory (JUNO) is proposed to determine the neutrino mass hierarchy using a 20 kton underground liquid scintillator center detector (CD).

One of the keys is the energy resolution of the CD to reach $<3\%$ @ 1 MeV, where totally 15,000 $20''$ MCP-PMT will be used. To optimize the $20''$ MCP-PMT with better detection efficiency, stable performance, and long life is very important and going on by JUNO. In this work, we will show the study to optimize the MCP-PMT working configuration with JUNO for charge measurement in collection efficiency and charge linearity. Particularly, the overshoot coupled with positive HV which is troubling trigger, dead time and precise charge measurement, we have studied to control it to less than $\sim 1\%$ of signal amplitude for a better physics measurement.

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