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Studies of single-photoelectron response of 20-inch NNVT MCP-PMT

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The use of large-area photomultipliers is reasonable in large-volume liquid-scintillation neutrino detectors, such as JUNO or the planned Baksan Large Neutrino Telescope. There are currently two models of 20-inch photomultipliers on the market, the dynode-PMTs Hamamatsu R12680 and the NNVT MCP-PMTs (microchannel plate PMTs), both are used in JUNO. However, despite some advantages of the NNVT MCP-PMT, there is a problem of determining their single-photoelectron response, which entails the problem of determining the number of photoelectrons and, therefore, the energy of the particles. In this work, we have studied the single-photoelectron response of the NNVT MCP-PMT and some of its other characteristics, and compared them with the characteristics of the Hamamatsu R12860.

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