

## A new design of large area MCP-PMT for the next generation neutrino experiment

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A new design of large area MCP-PMT for the next generation neutrino experiments is proposed. The main motivation of the design is to improve the quantum efficiency (photo detection efficiency) of the PMT. Two sets of small MCP units, the transmission photocathode coated on the front hemisphere and the reflection photocathode coated on the rear hemisphere are assembled in the same glass envelope to form nearly  $4\pi$  viewing angle to enhance the efficiency of the photoelectron detection. The photoelectrons from the  $4\pi$  photocathode are collected and amplified by two sets of MCP units. Our goal is eventually to produce 20 in. diameter PMT following such an approach. We will report preliminary results of our photo-electronic simulation and the results of a 5 in. diameter prototype PMT. Future plans and prospects are discussed at the end.

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