

Preliminary PET imaging based on multi-anode Cherenkov Radiator-integrated Window MCP-PMTs

Further improving the CTR of PET systems, achieving higher SNR gains or even dPEI puts demands on the fast-timing properties of PET detectors. One effective approach to optimize the timing performance of PET detectors is to fully utilize the prompt properties of Cherenkov photons by employing MCP-PMT. In this work, we established a PET imaging experimental setup using specially designed Cherenkov Radiator-integrated Window (CRW) 8*8 anodes MCP-PMTs and multi-channel electronics based on discriminator and TDC. Imaging experiments were conducted for point source and rod source, and we successfully achieved preliminary PET imaging using the multi-anode CRW-MCP-PMT for the first time. The obtained CTR was 123.7 ps FWHM, and an image resolution of 3.05 mm FWHM was achieved, these initially proved the feasibility and advancement of using the multi-anode CRW-MCP-PMT as a PET detector. Based on the experimental results, we have analyzed the importance of addressing non-uniformity and have initiated the integration of relevant detector and electronics optimizations into the experiment. A PET imaging experiment based on the CRW-MCP-PMT with higher timing performance and larger field of view will be realized in the near future.

Field

Detectors and electronics

Primary authors: PAN, Weiyan (Institute of High Energy Physics, Chinese Academy of Sciences.); WANG, Yingjie (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-authors: Mr YUAN, Hang (Institute of High Energy Physics, Chinese Academy of Sciences.); Mr WEI, Long (Institute of High Energy Physics, Chinese Academy of Sciences.); Mr WANG, Tianyi (Institute of High Energy Physics, Chinese Academy of Sciences.); Mr HUANG, Xianchao (Institute of High Energy Physics, Chinese Academy of Sciences.); Ms HAN, Xiaorou (Institute of High Energy Physics, Chinese Academy of Sciences.); Mr NING, Zhe (Institute of High Energy Physics, Chinese Academy of Sciences.); Mr ZHANG, Zhiming (Institute of High Energy Physics, Chinese Academy of Sciences.)

Presenter: WANG, Yingjie (Institute of High Energy Physics, Chinese Academy of Sciences)

Session Classification: Poster Session

Track Classification: Fast timing