

title: 「Vacuum and gaseous photon detector studies」

abstract:

A future DIRC-like detector needs to develop new fast photon detectors capable of achieving 100-200ps timing resolution per single photon, capable of operating in high magnetic field of 15kG. The talk describes systematic studies of the single photon timing resolution, position response, aging and a long-term experience in the Focusing DIRC prototype with two vacuum-based 64-pixel detectors: (a) Hamamatsu Flat Panel PMTs, and (b) Burle MCP-PMTs with 25 micron hole diameter. We also present new timing and pulse height response results with a very new Burle MCP-PMT with 10 micron hole diameter operating in a magnetic field of up to 15kG. We also discuss our next steps in the area of vacuum-based photon detectors.

The talk also describes effort to develop a permanently sealed gaseous photo-detector with the Bialkali photocathode based on the single MCP and Micromegas with pad readout. The most important point in the area of gaseous detectors is to suppress the ion backflow to the cathode, which limits the maximum achievable gain in these types of devices. We have invented a simple method using the inclined MCP holes, which are aligned with the electron Lorentz angle in the gas at a given magnetic field. The talk describes a design and the initial measurements at SLAC without a Bialkali photocathode.