

# R&D on MCP-PMTs for High Intensity Kaon experiments at CERN SPS

*Tuesday 16 May 2023 12:50 (15 minutes)*

The R&D project proposed is within the High-Intensity-Kaon-Experiment (HIKE), a high-intensity fixed-target kaon experiment at CERN SPS exploring the precision frontier of the SM in a complementary and synergic way LHC. The R&D goal is an application of photo-detector technology for ultra-fast timing single-photon detection with extended lifetime, and has synergies with the requirements of next-generation experiments foreseen at HL-LHC. To achieve excellent PID performances that will be crucial for HIKE physics exploitation, the kaon-identification detector must withstand high-intensity beams ( $\sim 200\text{MHz K}^+$  rate) and hit rates ( $\sim 10\text{MHz/cm}^2$ ) and deliver a 15ps time resolution and 95% PID efficiency. MCP-PMT technology is currently explored for this R&D project. However, the MCP-PMT lifetime and linearity at high rates imposed by the working conditions in HIKE pose unprecedented challenges not yet addressed by manufactures. MCP-PMTs with two-layers ALD-coating are a viable solution, if requirements on lifetime and stability at high rates are met.

## Requested length

10 minutes

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