

11th International Workshop on Ring Imaging Cherenkov Detectors (RICH2022)



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Large Area Picosecond Photodetector for the Upgrade II of the LHCb RICH

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The Large Area Picosecond Photodetector (LAPPD) is a commercially available microchannel plate (MCP) based photon detector that is currently driving the attention of the entire scientific community thanks to its large size, excellent timing resolution of 60 ps or better, high gain and low dark rate. The LAPPD has a large sensitive area of $200 \times 200 \text{ mm}^2$, making it an attractive device for RICH detectors at particle colliders, in neutrino experiments, but also in medical imaging and nuclear non-proliferation.

We report on the performance of a new generation-II LAPPD, which is readout by capacitively coupling the signal onto an 8×8 array of square pixels. Measurements of the time resolution, gain and dark count in the laboratory will be presented.

With its excellent time resolution, the LAPPD is a promising candidate photon detector for the Ring Imaging Cherenkov (RICH) detectors of the LHCb experiment where a future LHCb Upgrade II is foreseen at the beginning of the next decade in order to operate the experiment at the full instantaneous luminosity available in the high luminosity phase of the Large Hadron collider. We will also discuss applications for LAPPDs for neutrino detection in water Cherenkov detectors and in medical imaging.

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