## VCl2022 - The 16th Vienna Conference on Instrumentation



Contribution ID: 338

Type: Recorded Presentation

## Performances of the Large Area Picosecond Photo Detector for the LHCb Upgrade-2

The increase in instantaneous luminosity during the high-lumi phase of the LHC will require detectors capable of mitigating the pileup of proton-proton collisions. A promising strategy is to add the measurement of the time of the hits, exploiting the time separation of the various primary interactions. Time resolutions of the order of 10-20 picoseconds, at least an order of magnitude shorter than the average time span between primary proton-proton collisions, are necessary. A campaign of feasibility studies to exploit the technology of large area picosecond photodetectors (LAPPD) is under investigation for various sub detectors of the LHCb Upgrade-2. The LAPPD is the largest microchannel-plate photomultiplier ever built, all made with inexpensive materials. Laser and electron beam tests at DESY and SPS are used to characterise three LAPPD versions currently available: Gen-I with internal stripline readout and either 10 or 20 um pore sizes, and Gen-II with external pixelated readout and 20 um pore size. Time resolutions as good as 20 ps with single photoelectrons and a few ps with multiple photoelectrons have been demonstrated by the studies. The capabilities of the LAPPD to cope with high rates of incident particles have also been studied. Details of the various experimental setups that have been used and of the relevant results will be shown and discussed.

## **Primary experiment**

LHCb

Authors: PERAZZINI, Stefano (Universita e INFN, Bologna (IT)); VAGNONI, Vincenzo (INFN Bologna (IT))

Presenter: PERAZZINI, Stefano (Universita e INFN, Bologna (IT))

Track Classification: Photon Detectors