Contribution ID: 149

Type: talk

Precise timing and recent advancements with segmented anode PICOSEC Micromegas prototypes (in-person)

Thursday 16 September 2021 12:40 (15 minutes)

Emerging challenges in current and future accelerator facilities appoint timing as an important variable to resolve extremely large event multiplicities on particle detection systems. The PICOSEC Micromegas detector has demonstrated the ability to time 150GeV muons with sub-25ps precision. Driven by detailed simulation studies and a phenomenological model, which describes stochastically the dynamics of the signal formation in the detector, new PICOSEC designs were developed that significantly improve the timing performance of the detector. As an example, PICOSEC prototypes with reduced drift gap size (~ 119 μ m) reached a resolution of 45ps (in comparison to 76ps of the standard PICOSEC prototype) in timing single photons in laser beam tests.

Towards large area coverage detectors, the approach of a multi-pad PICOSEC prototype with a segmented anode has been selected and developed. Extensive tests in particle beams revealed that the multi-pad version of the PICOSEC achieve time resolution comparable with the single-pad detector, even when the MIP induced signal is shared among several neighbouring pads.

An overview of results, incorporating recent advancements on the PICOSEC instrumentation will be presented along with studies for new photocathode materials, resistive anode technologies as well as digitization electronics, for a scalable, radiation hard, resistive PICOSEC Micromegas detectors for very precise timing.

Your name

Ioannis Manthos

email

i.manthos@bham.ac.uk

Title

Dr

Nationality

Greek

Institute

University of Birmingham

Author: Dr MANTHOS, Ioannis (University of Birmingham (GB))

Presenter: Dr MANTHOS, Ioannis (University of Birmingham (GB))

Session Classification: Applications in Condensed Matter; Position Sensitive Fast Timing Detectors 2

Track Classification: Position Sensitive Fast Timing Detectors