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GasToF: Picosecond resolution timing detector using MCP-PMTs

Development of GasToF, a picosecond resolution Cherenkov gas detector using the fastest single anode MCP-PMTs, is reviewed including its various design options. New results obtained from measurements at the CERN test-beams in August and September 2010 are presented. In particular, the measured timing resolution of about 5 ps is discussed in depth. This is confronted with detailed modelling of the response of Hamamatsu R3809 and Photek 210 tubes and recent results obtained at a fast laser test stand. The next GasToF development stage using the multi-anode MCP-PMTs is then described, and the outlook for future developments is given, including the applications in medical instrumentation.

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